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THE PASSING OF CHINA'S ANCIENT SYSTEM OF LITERARY EXAMINATIONS.

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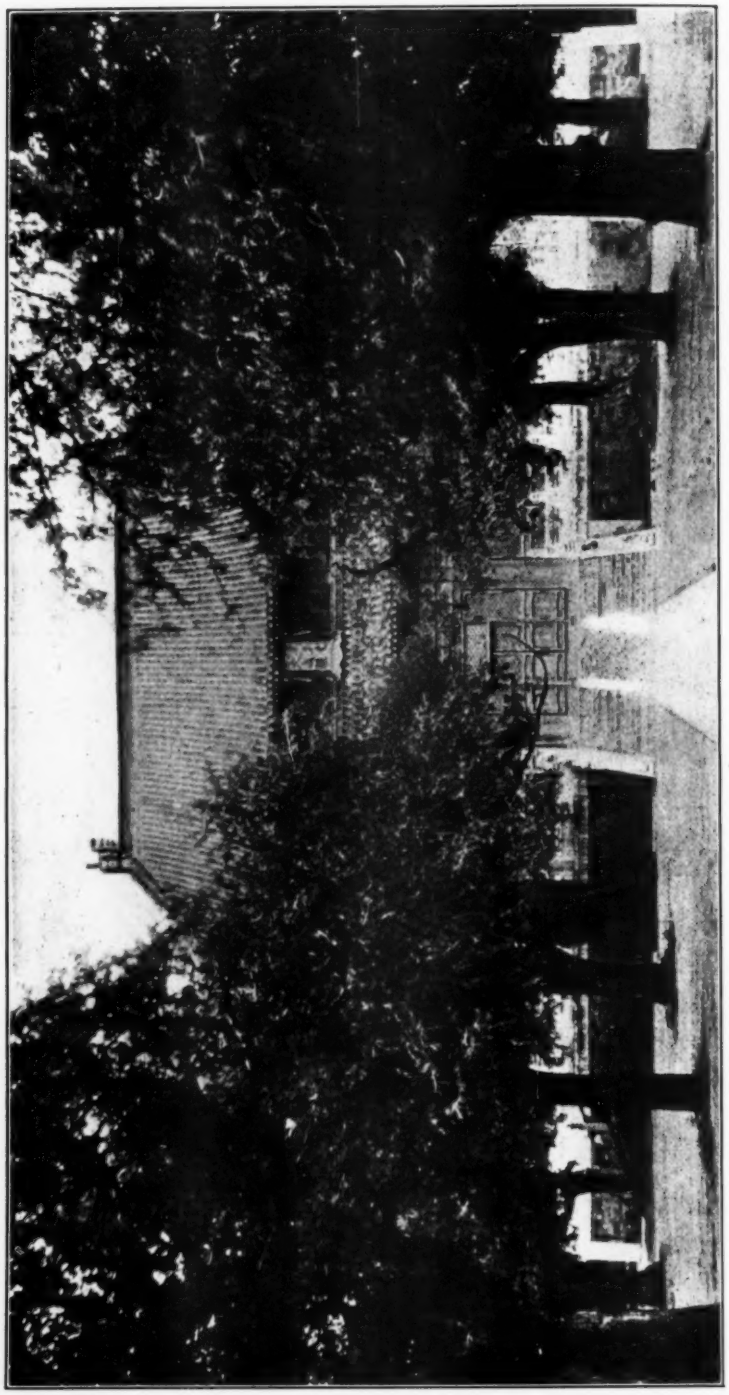
IN a previous paper we reviewed the subject matter of Chinese education and recalled the fact that there is not, and practically never was, a school system in China, though a characteristic method of instruction has prevailed for ages, which by reason of its imitative and servile nature has repressed originality and drilled the nation into a slavish adherence to venerated usage and dictation without supplying real or useful knowledge.

Without doubt, the heart of China's nationhood thus far has been her system of literary examinations, and the place given to scholars in all phases of the nation's life combined with the inefficient character of the learning they possessed has been the primary cause of the nation's peculiar course and its present weak condition, from which happily it is awakening through the adjustment of education to the real needs of life.

The darkest days of the west, when Europe was wrapped in the ignorance and degradation of the middle ages, were the brightest days in the east. China was then probably the most civilized country on earth and exercised a humanizing influence on all surrounding states. Had she kept the lead she then held, instead of presenting to the world as she now does the most remarkable case of arrested development within historic time, China would be in fact what for so many centuries she has so fondly but mistakenly considered herself to be, the mightiest of the mighty powers.

It is indeed striking in a country which can count back to schools more ancient than those of any other living race that the scholars of



THE CONFUCIAN TEMPLE, PEKING, in the Court of which the names of graduates have been carved on stone tablets for the past 600 years.

the realm should of all the learned men of the age be the most ignorant of essential and practical truths; that a nation which possessed the most elaborate system of civil service examinations should be served by officials at least as corrupt and as inefficient as those of any other great nation; that a government which made literary attainment a condition of office-holding was content to develop an imposing superstructure of examinations and rewards and neglected to lay the foundation for such in a system of common schools.

The method of instruction which has prevailed wherever there have been any schools at all—a method not only very ancient, but proceeding from, and at the same time in great part responsible for, those characteristics which mark the Chinese under every variety of physical condition—has been of a hard and unyielding nature, and has caused enough wasted energy during the last seven hundred years to have sufficed for more than ten thousand years of true education, and this has made China what she is to-day. While the government has fostered culture by testing attainments and granting rewards, thus affording an efficient stimulus on a large scale and constituting a regulated state patronage of letters according to which the reward of literary merit was a law of the empire and a right of the people, it is also true that up to the present time Chinese education has been entirely political in aim and has been valued merely as a means of securing the repose of the state, and, as soon as a sufficient supply of disciplined agents has been at hand, the enlightenment of the people has lacked governmental regard.

But such a state of affairs can not longer endure—the wall is breaking down; and it is the purpose of the present paper, without attempting to characterize further this old method of instruction or to point out its gradual and general renovation under the influence of Western thought and life and especially of the christian schools throughout the land, to call attention to the latest and perhaps most important step in the line of advance, *viz.*, the practically complete abolition of the ancient system of literary examinations and degrees given to advanced students in Chinese history, philosophy and poetry.

Perhaps the most accomplished of China's long line of monarchs was Li Shi-min, second emperor of the Tang Dynasty (618–908 A. D.). 'Famed alike for his wisdom and nobleness, his conquests and good government, his temperance, cultivated tastes and patronage of literary men,' he ranks with Marcus Aurelius, or with Charlemagne, who came to his throne in the next century. Under his direction great pains were taken to preserve the records of former days and to draw up full annals of the recent dynasties. He published a complete and accurate edition of all the classics under the supervision of the most learned men of the realm, and honored the memory of Confucius with

THE 'CLEAR FAR-SEEING TOWER' OR LOOKOUT IN THE MIDST OF THE EXAMINATION HALLS AT NANKING.

special ceremonies. Under him, the system of education, dimly begun before Abraham left Ur of the Chaldees and continued till to-day, took on most of its modern aspects, so that 627 A. D. may be taken as the real birth time of this method of preparing statesmen by study and degrees. The colleges in Peking and all the chief cities were co-ordinated, and the officers of the empire recruited from the examination halls. These literary degrees in China dating from the seventh

MAIN CORRIDOR, EXAMINATION HALLS, CANTON. Long rows of stalls on either side at right angles to the walk.

century are the most ancient literary rewards still in use in any country. In the days of the Tangs also, the examinations were placed under the Board of Rites, and military examinations and medical colleges of a very primitive character were established.

For the purposes of general government each of the nineteen provinces of the empire is divided into ten, fifteen or twenty prefectures, and, according to the system now passing away, each prefectural city, or county seat, has been a headquarters for the first degree, which is called Hsiu Ts'ai, or 'Flowering Talent.' Two resident examiners in each prefecture have kept records of competing students and exercised them from time to time. A literary chancellor in each province has held office for three years and visited each prefectural city to hold bi-annual examinations for the first degree. The halls in which these tests have been held are elaborate sets of buildings, where the students could sit in long rows and write their themes on topics taken from or dealing with the string of ideas which comprise the content of Chinese education. About two thousand were accommodated at once in an average test.

The trials for the second degree, Chü Jên or 'promoted scholar,' have been held in the provincial capitals, and the vast halls arranged for this purpose provide individual stalls sometimes, as at Nanking, for thirty thousand candidates at the same time, in which the aspiring scholars had to spend three sessions of three days each endeavoring to compose victorious essays on themes relating to Chinese history, philosophy, criticism and various branches of archeology, besides trying their skill as writers of poetry. Two special examiners for each province, generally Hanlin, were deputed from Peking to conduct these great triennial examinations which were the most elaborate and characteristic of the whole system. In them, as also in the tests for the first degree, the coveted honor was bestowed on not more than one per cent. of the candidates. The unsuccessful, however, were allowed to try again indefinitely, which some did.

The third degree, denominated Chin Shih, or 'Fit for Office,' has been awarded every three years in Peking, cabinet ministers presiding. The fourth degree has also been awarded every three years at Peking, the trial taking place in the palace and all the successful candidates becoming Hanlin, or members of the 'Forest of Pencils,' an association of imperial scribes, which constitutes one of the pivots of the empire and the very center of its literary activity. Membership in this Imperial or Hanlin Academy has then been the goal of literary attainment, for this long series of contests has culminated every three years in the appointment by the emperor of a member of the academy as the model scholar of the realm.

To any one of these examinations only those were eligible who held

ROWS OF EXAMINATION STALLS AT NANKING, as seen from the 'Clear Far-seeing Tower.'

in good standing the next lower degree. But there has been an imperial examination in the presence of the emperor open to all those who had at least the second degree. Those who attained the highest rank were made district magistrates. The men in the second grade were styled 'professors.'

Some idea of the tremendous importance of any change in this system may be secured from the consideration that some 760,000 candidates competed biennially for the first degree, while about 190,000 competed triennially for the second degree—a total of 950,000 for the whole empire. (In the United States the total enrolment in universities, colleges and professional and normal schools for 1902 was 246,000.) And this does not take into account another 1,000,000 students

EXAMINATION STALLS AT NANKING, showing entrances to passages between long rows of stalls. The first stall in the right hand pasage is seen. Successive rows indicated by characters from the Millenary Classics.

who underwent preliminary tests at some 1,705 matriculation centers before they could enter the lists for the first degree. (In the United States the enrolment in public high schools and private academies and seminaries for 1902 was 735,000). Nor does it count the candidates for the third degree, triennially conferred at the capital. The stone lists at Peking show the award of 60,000 third degrees in the last 600 years. This system, operating at the 271 degree-giving halls throughout the empire, has produced every two years about 29,000 'bachelors,' and every three years over 1,500 'masters' and some 300 'doctors,' or a total of 123,000 successful graduates in the three grades every six years. (In all the universities of Europe the *enrolment* is less than 110,000.)

LITERARY DEGREE POLES, erected in the native village of the graduates.

With regard then to mere numbers the recent changes in the examination system affect some two million men, the flower of the nation. Of supreme significance is the part which they have played and are still playing in the national life. As Mr. R. E. Lewis has so well expressed it, the competitive civil service examinations of China have resulted in:

> *First:* A literary caste, which fills practically all the offices of the empire, and which is, therefore, the ruling force in the affairs of China, influencing the throne, and providing the administrators of the government. *Second:* The literati are the guardians of letters, and the examplars of the 'orthodox' religion. With them, letters and religion are not distinct, but the inseparable parts of a whole. *Third:* Not only are they the practical rulers of the empire, but in all matters pertaining to western civilization or progress, commercial and educational, they were up to 1898 the most absolutely conservative. *Fourth:* Not only have they been the rulers and the conservatives of China, but the student class was in the nineteenth century christianity's strongest opponent. Besides blocking the wheels of what all western nations consider progress, they, as a class, for years stood athwart the pathway of christianity with sullen defiance.

Now, by a recent imperial edict practically the whole scheme of literary civil service examinations is abolished, and no better indication of the depth to which new ideas have permeated the empire could be given than the fact that as yet, at least, scarcely a word of protest or remonstrance has been raised, even by this class of influential men

whose very position is an outcome of the system they are commanded to aid in abolishing. An edict after all is only an edict, and it may be too early yet to say just how it will be received when its measures begin actually to operate. It seems scarcely credible that it will go into full effect without some opposition in some quarters. Nevertheless, it is sure that, be the opposition what it may, the new régime is bound to triumph and produce mighty results at no far distant date. 'Out of the shadows of night an empire rolls into light. It is daybreak everywhere.'

In order to understand the 'ins and outs' of educational reform, as well as of reform in general, during the last decade in China, it is necessary to review a bit of Chinese court history.

In 1875, Prince Tsai Tien, then four years old, was selected by his aunt, the empress dowager, to succeed on the dragon throne her son, the Emperor Tung Chih, who had just died at the age of eighteen. In so doing she was led by motives of policy. There were two distinctly more eligible princes whom she ignored in order to hold the reins of government more completely in her own hands, for they were young men likely to desire to have their own way. All the conspiracies to oust the empress dowager and her partisans resulting from the choice of the infant Kuang Hsü, which was the reigning title conferred on him, were promptly crushed by the late Marquis Li Hung-chang, then viceroy of Chihli, who occupied the 'Forbidden City' with his foreign-drilled troops. In 1889 his majesty was permitted by the empress dowager nominally to assume the reins of government, with herself, of course, as principal adviser and director of affairs. For nearly ten years nothing worthy of note can be recorded, except that his actions were dominated by the influence and policy of his aunt. But the psychological moment, though utterly unforeseen, was fast approaching.

Through the continued influence of the mission schools and colleges throughout the land and the increasing contact in trade and diplomacy with western nations, western learning in all its departments assumed an increasing value, and ideas of change began to ferment in the Chinese mind. Prince Kung of the imperial family addressed the throne prior to the Japanese War, declaring that the progress of the empire demanded the casting aside of their superficial learning and the acquisition of the arts and sciences which are the foundation of the prosperity of western nations. Encouraged by the governmental approval of certain modern schools established in Shanghai and Tientsin, other men having the ear of the emperor, who was profoundly moved by the result of the war with Japan and clearly saw that there must be something wrong with his country and its mode of government, advocated the new education, and their pleas, aided by the

MR. WU, FIRST HONOR MAN AT THE LAST 'TRIENNIAL' FOR THE SECOND DEGREE IN CHE-KIANG PROVINCE.

pressure of foreign governments, notably Germany and Russia, brought about the change of policy which followed Prince Kung's memorial to the throne. The crisis arrived when Kang Yu-wei and his party of earnest, progressive young men arrived from Canton in 1898, nominally for the triennial literary examinations, but really to put on foot if possible the needed educational reforms. Kang Yu-wei became the confidential adviser of his majesty, and the first imperial decree seeking to inaugurate an era of general betterment in government and education was issued January 17, 1898. This was followed on June 23, with a decree ordering the Board of Rites to remodel the examinations, saying:

> We have been compelled to issue this decree because our examinations have degenerated to the lowest point, and we see no other way to remedy matters than by changing entirely the old methods of examination for a new course of competition. Let us all try to reject empty and useless knowledge, which has no practical value in the crisis we are passing through.

The emperor further called for the establishment of a government university of foreign literature and science at Peking and of provincial

schools of three grades: (1) in provincial capitals, (2) in prefectural cities, (3) in district cities, and demanded an immediate census of existing colleges and free schools providing that funds for education be derived from the earnings of the China Merchants' Steam Navigation Company, the Imperial Telegraph Administration, the Weising Lottery and the gifts of wealthy men, who were to be rewarded with rank beyond the usual scale. All memorial or other temples, except those in which sacrifices are required by edict, were to be turned into schools and colleges for the new learning, and all who studied in and graduated from these new institutions were to be accepted in the government service in the usual way. Other edicts commended copyright and patent privileges and offered rewards to authors of books and inventors of machinery and works of utility.

Considerable consternation was caused by these decrees. So long, however, as the reforms did not interfere with the dominance of the dowager, she offered no great opposition; but when the reformers aimed at her confinement at Eho Park, so as to remove her from the scene of action, she, backed by the reactionary party, which, after all, comprised the most powerful portion of both the metropolitan and the provisional mandarinate, promptly brought about the *coup d'état* of September 22, 1898, by which her majesty removed Kuang Hsü from power, became regent both in name and in fact once more, ordered the execution of Kang Yu-wei and many of his supporters of lesser rank, and cashiered those of higher station. Kang Yu-wei escaped, but six promising young men were put to death without trial within a few days. On November 13, the empress dowager issued a decree approving a memorial from the ministers of the Board of Rites, dilating on "the supreme importance of making it known throughout the whole empire that there are to be no changes from the old method of literary examinations among candidates for degrees, in order to set at rest, once for all, the present uncertainty that has been caused by the emperor's recent reform measures in the above direction."

Thus an era of intensified, bigoted conservatism returned, and strange to say, the literati, who as the real leaders of the people had for so many years solidly opposed western education, were the chief mourners. According to Mr. R. E. Lewis, there is evidence that in the inland provinces of Honan, Hunan, Shansi and Szechuan, as well as in the literary centers nearer the port cities, the literati were greatly disappointed when the Manchu clan leaders crushed the plans of reform. This new attitude of the literati was a revelation to most onlookers and foreshadowed the remarkable way in which more recent changes have been received by them.

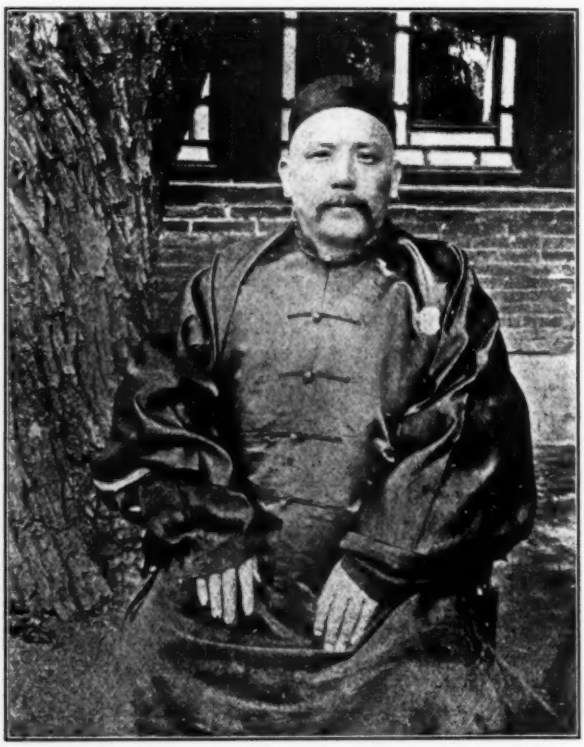
The leaven which the emperor had introduced was working in the empire, though he himself was a discredited prisoner in his own palace.

Editors of vernacular journals throughout the country, especially in Canton (the very stronghold of literary conservatism, yet the place where Kang Yu-wei had been conducting his progressive school) continued the crusade of reform, so that "one believed a cleansing storm would soon pass over the land. And the storm came drenching part of the country in blood." The era of conservatism and opposition to things western culminated in the Boxer uprising of 1900, which put Peking into the hands of the allies and drove the imperial court into exile as far as Hsian, the capital of Shensi province. Here in 1901, while still in exile, the empress dowager, into the hearts of whose advisers a desire for better things had come as a result of the lessons taught by the allies, astonished her people and the world by promulgating the very educational reforms for which the emperor had been deposed. Her decree provided that henceforth in provincial and central examinations the three groups of subjects should be as follows: (1) Five topics relating to the government and history of China; (2) Five themes upon the government, arts and sciences of all lands; (3) Exposition of two passages from the 'Four Books' and one from the 'Five Classics.' Examiners were commanded to weight the three groups equally, and in exposition of the canonical books candidates were forbidden to use the form of the eight-legged essay, hitherto required. In writing on the practical subjects in groups 1 and 2, the presentation of reality and not empty rhetoric was enjoined.

But it would be rash to declare this reform to have been complete in fact. 'Clean sweeps' are rare, perhaps rarer in China than elsewhere. How by the stroke of the imperial pen can the mind of the nation take a new course and a million of men yearly become acquainted with 'modern matters'? The vastness of the problem requires years of intelligent, patient effort for its solution. Most of the chancellors are as ignorant as the students they are set to examine as to the 'laws, constitutions and political economy of western lands.' In Shangtung at the first examination after the reform decrees of 1901, the chancellor did indeed prepare a list of books by means of which the candidates were to prepare themselves in such matters as 'political economy, commercial intercourse, military training, common law, international law, astronomy, geography, physics, mathematics, manufactures, sound, light, chemistry and electricity.' But the list, while containing one good arithmetic, consisted chiefly of out-of-date books, several lists of scientific terms, a scientific magazine defunct some ten years before, the whole being thrown together without order. Yet it is certain that a list of text-books in general use in the foreign-conducted schools of China was presented to him, though no use was made of it.

In order to get an idea of the exact nature of the change brought

about in the subject-matter of the examinations by these decrees of 1901, let us compare briefly some of the questions and topics of the old régime with some of the most recent ones, *viz.*, those of 1903, which are the last to be given under the passing system. To make our survey representative, we shall in the case of the recent examinations consider those held in Chihli as the province containing the capital of the realm, in Shangtung as the province where Confucius and Mencius lived and taught, in Kiangsu as the province of greatest literary



YUAN SHIH-KAI, VICEROY OF CHIHLI, CHIEF MEMORIALIST IN BEHALF OF EDUCATIONAL REFORM. The most powerful subject in China.

fame, and in Canton as the province deemed most conservative in literary affairs.

SAMPLE THEMES OF THE OLD SYSTEM.

1828. From the 'Four Books.' To serve as topics of essays.

To possess ability, and yet ask of those who do not; to know much, and yet inquire of those who know less; to possess, and yet to appear not to possess; to be full, and yet appear empty.

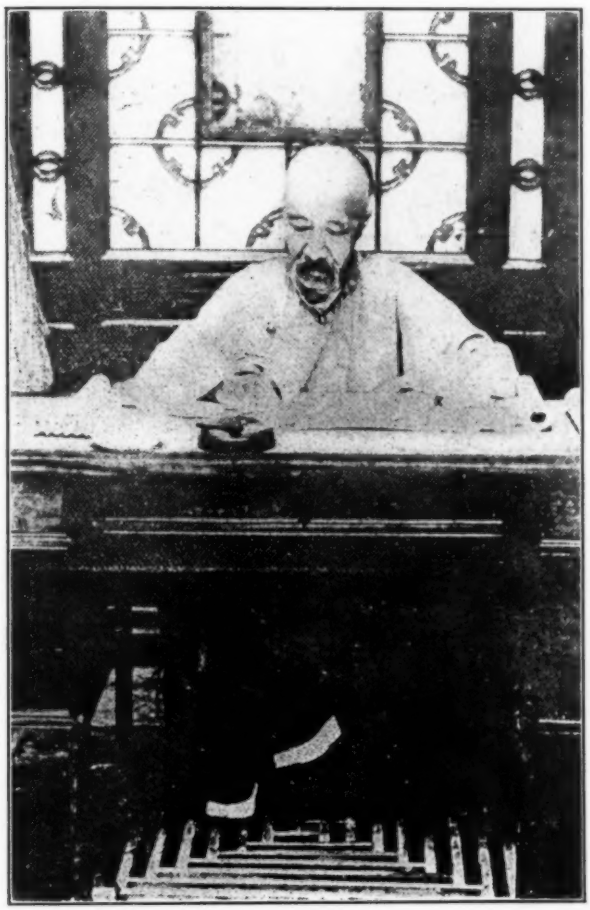
He took hold of things by the two extremes, and in his treatment of the people maintained the golden mean.

A man from his youth studies right principles, and when he arrives at manhood, he wishes to reduce them to practise.

In pentameters write on The sound of the oar, and the green of the hills and water.

1835. He acts as he ought, both to the common people and official men, receives his revenue from Heaven, and by it is protected and highly esteemed.

(More practical.) Fire arms began with the use of rockets in the Chau dynasty; in what book do we first meet with the word for cannon? Is the defence of Kaigungfu its first recorded use? Kublai Khan, it is said, obtained cannon of a new kind; from whom did he obtain them? When the Ming emperors, in the region of Yunglok, invaded Cochinchina, they obtained a



CHANG CHIH-TUNG, VICEROY OF THE HU KUANG PROVINCES, who aided Viceroy Yuan Shih-Kai in preparing the memorial advising the abolition of the examination system.

kind of cannon called the weapons of the gods; can you give an account of their origin?

1853. In the Han Dynasty, there were three commentators on the Yih King, whose explanations, and divisions into chapters and sentences were all different: can you give an account of them?

Sz'ma Tsien took the classics and ancient records in arranging his his-

tory according to their facts; some have accused him of unduly exalting the Taoists and thinking too highly of wealth and power. Pan Ku is clear and comprehensive, but on astronomy and the Five Elements, he has written more than enough. Give examples and proof of these two statements.

Chin Shao had admirable abilities for historical writings. In his San Kwoh Chí he has depreciated Chu-koh Liang, and made very light of I′ and I′, two other celebrated characters. What does he say of them?

From the 'Five Classics.' Treatment to be more recondite and in a higher style.

When persons in high stations are sincere in the performance of relative and domestic duties, the people generally will be stimulated to the practise of virtue.

Essays in this section were characterized by a jejune style and reasoning in a circle. Such topics as were given throughout the whole

ENTRANCE TO THE HEADQUARTERS OF THE BUREAU OF EDUCATION FOR THE TWO KWONG PROVINCES, CANTON. Commodious buildings erected in 1889 by Chang Chih-tung as editorial rooms in connection with a large old-style school started by him when Viceroy in Canton. Occupied by the New Bureau of Education in 1903.

system involved a wide range of reading in the native literature, but narrowed the vision to regard this literature as containing all that is worth anything in the world. Yet the discipline of mind and memory incident to preparing for these tests, supplemented by the friction and experience of public life, made statesmen out of scholars and did much to give China her influence in Asia. Contrast these topics, however, with more recent ones.

SAMPLE THEMES FROM THE LAST TRIENNIAL EXAMINATION (1903). ON SYSTEM AS MODIFIED BY EDICT OF 1901.

Group II. Modern Matters.

Five questions or topics in such examination for the second degree are proposed for discussion in this group. We present selected ones from those assigned at four chief literary centers in North, Central and South China. Where we present less than five questions for one center, it is because those omitted are practically duplicated by those presented for other centers.

Peking, Chihli.—2. Western commerce depends essentially upon knowledge of animals and plants. Cattle and sheep are raised by regulated methods, climates fit for separate kinds of cattle are distinguished, soils and their specific adaptations are studied. China should find out the best way to promote industry and commerce in like fashion. Discuss this.

3. Metternich and Bismarck greatly aided in the advance of their countries. Tell briefly what they did.

4. We should study Chinese literature as a subject in itself. Discuss whether Chinese literature should be a subject in a scheme of modern education.

Tsi Nan, Shangtung.—1. Western economists always say that the production of wealth depends entirely on the three elements: Land, labor and capital. But the capital of China is getting less and less, when we Chinese want to do business we have to invite foreign merchants as partners, and the poor people who are out of work have to go to foreign countries to labor in order to earn their living. What must we do on the whole to strengthen our country and get back all the lost profits from foreigners?

2. No people can live without society. But where there is society there is struggle. The English scholar, Herbert Spencer, says: It is good for people to form societies, and that through wars a people are compacted. When the people are more of a unit, progress is easier and a higher civilization will be attained. And again, he says that among those people who like to fight wars, civilization will decline or be retarded. What does he really mean by these seemingly opposite expressions?

3. Penal codes of the east and west are different. One is severe and the other lenient. Since Japan has changed her penal code, she has gained power to punish even foreign offenders residing in Japan and to deal with other nations. China has changed a little in dealing with foreigners in the treaty-ports. But this rule differs from the method of internal or interior rule. If we want to change the penal code entirely, do you think there would be opposition from the people? If there is no opposition, can it be made universal throughout China?

4. Since the government has allowed the presence and work of foreign missionaries many foolish people have sought refuge from the law of the land under the protection of the missionary by becoming converts and some anti-christians make a great deal of trouble throughout the empire. Because of this foreigners look down on China and declare that she is a country without education and without religion. But foreign scholars who are familiar with the literature of China say that five hundred years hence, Confucianism will be spread over the whole world. The trouble at present is that we do not know how properly to propagate Confucianism, and not that the foolish people who are false christians can injure our religion. If we want our religion to grow and the people to progress, what shall we do, what is the best plan to follow?

5. All the nations of the world have now come into relation with each other by interchange of intelligence and commodities. Before this they had to

protect their coasts and borders, but now they must maintain navies. But in the present condition of China, the navy is not well organized, the forts and fortifications have been destroyed and abandoned. The ports have been leased to foreigners. All the doors have been opened. Certain foreign railroads can go straight into Chinese territory. The condition of Manchuria and Tibet is critical. Neighboring nations are seeking an entrance. We can not rely on our dependencies for support. If we want to develop a strong army and navy, what is the best way to do so? Suggest the best plan to follow.

Nanking Kiangsu.—1. Western countries have established commercial centers and subsidized and protected great enterprises, railroad and steamship lines for transportation, banks and newspapers as a key to unlock the country's resources, postal routes and telegraph lines to spread news very quickly, and schools for education. In what order as to importance should we establish these things in China, according to the western principle?

2. Post offices are now gradually being established all over China. Tell by what postal routes and over what distances letters can be sent and how many offices there are. Should we establish any more? How improve the postal service?

3. At what place to the south of Europe are the Caucus. Has it any other name? Russia took it and established many new laws—what are these laws and when established?

4. Opium and salt taxes. In the last few years many provinces have paid different amounts toward the war indemnity to foreign countries, because the taxes in these provinces are different. There is much squeezing and the people suffer. Now we ought to get a good way to conduct this business. Suggest a plan.

Canton, Kwangtung.—1. Western countries all use gold coinage. They have the cent and shilling for local exchange and these have a fixed value. The government of China is planning to change its currency to a gold basis. The dollar and the cent of China ought to have a fixed value so as to expedite the payment of taxes and benefit the country. Discuss this proposition.

3. Industrial schools are good for the poor people. If China has this kind of schools the necessity of importing foreign goods will be done away with. Philanthropic societies in all the districts of China have done good work in aiding the poorer classes of the community. If we want to use a part of the funds of such societies to build industrial schools, so that the poor may have an education—to earn a living, besides being fed—in addition to these funds, what other way could be employed to secure money for this purpose?

4. Foreign countries have power to manage their own affairs in the treaty ports of China. When the Chinese have trouble with a foreigner, they do not have the same or equal standing in the court or in the community at large. We want to alter the law and adopt some of the laws of foreign countries and to establish a code for international relations so that if we have affairs with foreigners, we can have the right to administer justice so that foreigners can not be unjustly shielded.

The introduction of even such meager questions in western sciences was an entering wedge which, aside from the more recent decision to eliminate the classical requirements entirely, was destined to lift the Chinese out of their medieval scholasticism into the full light of modern knowledge. The reform edict of the dowager was accompanied by other edicts providing for sending young men abroad to study, for the

establishment of provincial colleges and the organization of a common-school system. Already these young men are returning, some of them with honors from the best schools of the west; and one of them, who also holds his Chinese second degree, wrote two years ago:

> Every Chinese man knows that the examination system is not good, and so the government has resolved to establish schools, colleges and universities, instead of all the kinds of examinations. For the examinations of the next term, the number of Hsiu Ts'ai, Chü Jên and Chin Shih will be diminished and, several years after, all the examinations will be dismissed.

Thus the recent decree giving the last blow to the old system was not entirely unforeseen, though it was scarcely expected so soon.

H. E. Yuan Shih-kai, holder of the senior viceroyalty of the empire, that of Chihli, the most powerful subject in China, and the very man whose devotion to the empress dowager when the emperor called for his assistance in 1898 made her *coup d'état* possible, sent in a memorial which was approved and made operative in an imperial decree dated September 2, 1905, advocating the summary abolition of the old style literary examinations, in order to allow the expansion of modern modes of education throughout the empire. Associated with him as memorialists were H. E. Chao Erh-sên, the Tartar general of Mukden and viceroy of Fêngtien province (Lower Manchuria), H. E. Chang Shih-tung, viceroy of the Hukuang provinces, H. E. Chou Fu, acting viceroy of the Liangkiang provinces, H. E. Tsên Ch'un-hsuen, acting viceroy of the two Kuang provinces, and H. E. Tuan Fang, governor of Hunan province. This is the strongest list available throughout the whole empire, and it was but natural that the empress dowager should have been so impressed that even if she were at heart opposed to the epoch-making step, she could but tell the emperor to sanction it, in spite of the opposition which Wang Wên-shao, Lu Ch'uan-lin and others are reported to have made against the 'revolutionary' memorial. Though signed by this group of influential viceroys, the plea was really the work of H. E. Yuan Shih-kai, assisted by H. E. Chang Chih-tung. With their unfailing astuteness, they point out that what they propose is not after all a new scheme, but a return to a former usage. The literary examinations may seem to us of venerable antiquity, but these viceroys point out that they are really modern innovations on an older and much better system which they desire to recall. Theirs is not the destructive hand of the reformer, but the conservative hand of the restorer. The decree says:

> Before the era of the 'Three Dynasties,' men for office were selected from the schools, and it must be confessed that the plan produced many talented men. It was indeed a most successful plan for creating a nursery for the disciplining of talents and the molding of character for our Empire of China. Indeed the examples before us of the wealth and power of Japan and the countries of the west have their foundation in no other than their own schools.

Just now we are passing through a crisis fraught with difficulties, and the country is most urgently in need of men of talents and abilities (of the modern sort). Owing to the fact that of late modern methods of education have been daily on the increase among us, we issued repeated commands to all our viceroys and governors of provinces to lose no time in establishing modern schools of learning in such number that every member of this empire may have the means of going there to study and learn something substantial in order to prepare himself to be of use to his country. We have indeed thought deeply on this subject.

The decree then states that the ministers of education have suggested the gradual abolition of the examinations, but Yuan Shih-kai, whose experience and knowledge are admitted, 'asserts that unless these old-style examinations are abolished once for all, the people of this empire will continue to show apathy and hesitate to join the modern schools of learning.' Yet it would seem that the demand for the change had really come from the people.

Hence if we desire to see the spread of modern education by the establishment of a number of schools, we must first abolish the old style of studying for the examinations. . . . We therefore hereby command that, beginning from the Ping-wu Cycle (1906), all competitive examinations for the literary degrees of Chü Jên and Chin Shih (Master of Arts and Doctor) after the old style shall be henceforth abolished, while the annual competitions in the cities of the various provinces for the Hsiu Ts'ai (Bachelor of Arts) or licentiate degree are also to be abolished at once. Those possessors of literary grades of the old-style Chü Jên and Hsiu Ts'ai who obtained their degrees prior to the issuance of this decree shall be given opportunities to take up official rank according to their respective grades and abilities.

So that literati who already hold Chinese degrees are not entirely neglected, but will have to buy text-books and attain a smattering at least of western knowledge if they wish to keep up. The rest of the decree urges all officials from viceroys to district magistrates to see that schools of all the necessary grades are established, and the ministers of education to distribute text-books at once to all the provinces, 'so that we may have a uniform system of teaching in all our schools.' A word of encouragement is added to soothe the country and induce it to meet freely the expense of these radical changes: 'The government being thus enabled to obtain men of talents and abilities, it follows that the cities and towns producing such bright lights of learning will also enjoy a reflected honor therefrom.'

Subsequent decrees (September 4 and 7) give the literary chancellors of the various provinces the duty of holding examinations and inspecting the schools of modern learning in the province to which each had been appointed in the old régime, and command each to act in conjunction with the viceroy or governor of his province, the control of the whole being removed from the Board of Rites into the hands of the ministers of education. The establishment of a special board for

educational affairs will soon be confirmed under the title Wen Pu or Board of Literature.

It was rather the abuse and not the fault of this literary civil service system that it compelled the mind of China to grind for ages in the mill of blind imitation. A competition which excited the deep interest of a whole nation must have exercised a correspondingly profound influence upon the education of the people and the stability of the government. The old system has cherished whatever national education there has been, and when the influence of western science predominates, as it is beginning to do, we shall see thousands, yea hundreds of thousands, of patient students pursuing scientific studies with an ardor equal to that formerly bestowed on literary competition. The problem of transition is a vast one, and not till men of modern training, necessarily young men, are appointed to the literary chancellorships of the empire, can this new and practical system be adequately established. But the struggle against custom and conservatism is on —probably an intense and prolonged effort, for these do not vanish in a day even in the presence of a goodly band of reformers—and from the struggle the rising race of modern students will come forth victorious to lead their country into the splendid destiny that awaits her.

It remains to be seen just what measures will be taken to establish adequate and efficient modern schools throughout the empire, but already the prime movers in the recent memorial have announced some very ambitious schemes. The viceroy of Chihli has decided to establish a monster normal school at Tientsin in order to prepare men to teach according to modern methods. It will be modeled after the one at Nanking, and will matriculate from Fêngtien, Shangtung, Honan and other provinces, as well as from Chihli. The president will be a returned student from Japan, Chin Pang-ping, who was recently awarded the Hanlin degree after passing a special examination. At Peking it is planned to erect new buildings on a site of more than 2,800 English acres, and to supersede the present Peking University with this new Imperial Chinese University. Dormitory accommodations for some 20,000 students are to be provided, while a portion of the grounds will be set apart for agricultural experiments. The site of the present university is to be utilized for the erection of a school for the daughters of princes, nobles and high ministers of state, which has been sanctioned by the empress dowager in response to the recommendations of H. E. Chang Pei-hsi, minister of education and president of the Board of Revenue, and H. E. Tuan Fang, substantive governor of Hunan province and one of the five imperial commissioners appointed to visit abroad.

At Canton the abolition of the biennial and triennial examinations causes a loss to the provincial treasury of nearly $350,000 silver an-

nually, as this sum was paid by a clique of wealthy gentry for the monopoly of conducting the Weising Lottery in connection with the examinations. It is reported that this serious deficit is to be met by arranging a domestic loan of three million taels at seven per cent. repayable in instalments within ten years, and that Viceroy Tsên has already received the imperial sanction to float this loan, which will be secured by other gambling monopolies, and has promised that the money thus obtained will be used only for local public works and for schools. The provincial government over a year ago opened a modern normal school in the ancient Examination Halls of Canton, under Japanese direction, and there are some 120 men over twenty years of age studying there, and also some 60 boys enrolled in a practise school.

To what extent existing government, privately endowed, and christian mission schools are prepared to meet the increased demand for modern education which these recent decrees will undoubtedly create might well form the subject of another paper. Suffice it here to point out the tremendous opportunity and responsibility thus presented to christian educational missions. The extent and geographical character of China and its division into provinces under viceroys makes China resemble America more closely than any other country, and we believe that the kind of informal, yet none the less real, national system of educational work in the United States is what China needs. America's merchants are invading the east with marked success, and her diplomacy is affecting the right course of political events. American educators should aid in the educational conquest just as fully. There could be no better way of showing our true friendship, in spite of recent events in connection with our enforcement of the Exclusion Treaty and China's boycott of American products, than thus to aid in the true enlightenment of China's millions. Aside from the motive of christian missions, our prestige in the east demands such altruistic effort.

THE LAPSES OF SPEECH[1]

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A SPECIAL interest attaches to the psychological relations of speech—an interest shared by the philologist, by reason of his recognition that the mode of use and growth of language, in spite of its arbitrary accretions, reflects the native traits of the impulses that gave it being; by the psychiatrist, for whom the observable disturbances of speech offer the most delicate and distinctive criteria of the nature and extent of inner defect; and by the psychologist, for its unique status as the embodiment and recapitulation, racial and individual, the record as well as the means of advance of the psychic endowment in efficiency, in scope and, above all, in analytic insight. Indeed there is hardly an aspect of the psychologist's pursuit that does not find pointed illustration among the extensively variable phenomena of language. I propose to indicate such of the habits, and particularly of the lapses of speech, as reflect the subconscious processes that participate in its normal functioning.

Psychologically, speech is but one of several modes of indicating that we appreciate the situations that confront us, that we judge and assimilate and combine these in rational fashion, and that we shape our conduct accordingly. A chess-player exhibits all this as distinctively as a debater; and the moves of the one, though quite remote from any verbal expression, are closely parallel to the arguments of the other. The analogies of speech with other forms of intelligent expression favor the expectation that the lapses of the two will exhibit a considerable range of resemblance; for both will be expressive of the common habit of the mind to step and trip in set measure. The reduction of ideas to words and the marshaling of words in expressive and conventionally regulated sentences is an intricate accomplishment, even to the expert; like all such, it requires that the technique thereof, the ability to register and manipulate the common factors that enter in kaleidoscopic shifting of position into the pattern of the fashioned product, shall have become a well-drilled habit. If we could look upon an exhibition of the art of constructing sentences with something of the objective, uninitiated attitude with which we observe the bewildering flight of the scores of bobbins and the shifting of the pins of the lace-maker, we should marvel

[1] This article will form an appendix in the volume, 'The Subsconscious,' shortly to appear from the press of Houghton, Mifflin and Co., Boston.

equally at the skill of the verbal craftsman, who, like the other, must take up each thread in just the right order, give it just the right twist, and make of the whole amazingly intricate business not the seemingly inevitable tangle, but a beautiful, orderly design. It is, indeed, easily intelligible that, in moments of wavering oversight, slight snarls and slips should occur. An intimate analysis of these lapses of speech may reveal details, by no other evidence so clearly exhibited, in regard to the subconscious operations that are normally required to shape sense and utterance to a successful issue.

The central relation seems to be this: the complexity of speech requires the occupation with many processes at once, and some of these —the nicer, more delicate, less familiar ones—will receive the major attention, while the routine factors engage but a minor degree of concern. Slight fluctuations in the condition of the speaker—physiological ones, such as fatigue, and, for the most part, psychological ones, such as excitement, apprehension, embarrassment—will induce variations in the nicety of adjustment that are recognizable as typical slips of tongue or pen, and, still more significantly, of the tongue-and-pen-guiding mechanism. Conformably to what is true of lapses of behavior in general, such slips will be predominantly expressive in type. We know what we wish to say; we give over the saying of it to the usual faithful mechanism, which on this occasion drops a stitch, or takes up the bobbins in wrong order, or plainly tangles the threads. With but one right way and so many wrong ones, it is significant that our departures from the intended design are so predominantly of a few types. There are the anticipations, the persistences, the interchanges, the substitutions[2] and the entanglements of letters, and of words and parts of words, and of phrases—all of them indicative of shortcomings in the minute distribution of attention and coordination. That which is now subconsciously in the margin and is being prepared for utterance, emerges ahead of its time; that which is waning after utterance persists too long and reenters the articulatory field; or both processes occur, the second, having usurped the place of the first, tumbles the legitimate predecessor into its own vacancy, while the more variable

[2] I shall not consider the difficulties of speech-coordination, such as speaking, *She sells sea shells,* or, *Peter Piper picked a peck of pickled peppers,* or in German, *Die Katze tritt die Treppe krumm,* or individually tripping words such as *Detektivtaktik,* though these are nothing more than pronounced cases of certain of the lapses considered. The one offers intrinsically difficult coordinations, upon which even deliberate effort may trip; while the other is usually accomplished with ease, but under released tension of guidance invites failure. Likewise have I, in citing instances, passed at once to the more complex and more natural ones, omitting those of formally simpler type. I must acknowledge my indebtedness for most of the illustrations to H. Heath Bawden: *A Study of Lapses,* 1900; and to Meringer and Meyer: *Versprechen und Verlesen,* 1895.

slips require, as do the more pronounced lapses of conduct, some illumination from the introspective side.

Whether we are speaking, or are reading aloud from the printed page, or are copying, or are engaged in original writing, we are likely to find that which is about to enter the motor field anticipating its utterance: for *between feeling and willing,* there emerges *between filling; expert persons* becomes *expersons;* a lecturer alludes to *the tropic of Cancercorn;* in public reading, *the beautiful is as useful* is rendered *the buseful;* in writing *pieces of machinery,* the pen writes *pieches.* So also in German: *Sturm und Drang* becomes *Strang;* one intending to say *Nach Innsbruck aus München* says *Nach Minnsbruck;* so also *Minuster für Kultur und Unterricht; Es war mir auf der Brust so schwer* emerges as *Es war mir auf der Schwert;* and (with the slip immediately noticed and corrected), *Die Sympather . . . die Japaner sind mir viel sympathischer.* So with persistence of words or fragments thereof: With *revelation* in mind, the speaker actually said, *Those who believe in evolution think that revolution;* and we meet with *refinement and gentlement* (*gentleness*); *secluded retruts* (*retreats*); *Die Psalmen sind Producte der jüdischen Müse* (*Muse*). Slips of anticipation are naturally more frequent than those of persistence, for the reason that the margin that is qualifying for consciousness is naturally closer to our concern than that which is dismissed or dismissible; and, perhaps still more naturally do both appear at once, thus producing interchanges of the threads of utterance. *Portar and mestle; in one swell foop; dame, leaf and blind; sody and boul; Phosford's acid Horsephate; go out on the corch to pool; make a noyful joise*—these hardly need interpretation, as execution reveals intent. Somewhat more divorced from meaning, yet intelligible, are, *Are you strailing out for your mole?* (*strolling out for your mail*); *which he whiches* (*wishes*); *the water the wetter* (*the wetter the water*); *flutter by* (*butterfly*). *Put the tray on the weights; going to the coal to buy the wharf; set your leg on four chairs,* are simple in formula; but *I bought three dollars* for *I bought my dress for three dollars; collooding* for *colliding in the loop; put plustard* for *put mustard and flour in the plaster,* are clear only after the intention is revealed. The German offers parallel models: *Die Milo von Venus; Wertlaut* (*Lautwert*); *Einen Zuck Huter* (*Einen Hut Zucker*); *Ich verganz gass* (*Ich vergass ganz*); *Zwecktischer Prak* (*praktischer Zweck*); *Tapps und Schnabak* (*Schnapps und Tabak*).

There are still more complex cases in which various of these factors and others combine to give the substituted expression more misleading similarity to the proper one. When the perverted phrase is meaningless and sounds strange to the ear, we are quite likely, though by no

means certain, to become aware of the lapse;[3] but when it has the glib sound or semblance of sense, it passes unnoticed before the sensory sentinel. The much-cited scholar who spoke of the *half-warmed fish* that one feels in one's breast (*half-formed wish*) perhaps reached the acme of sensible sounding absurdity. On the same plane is the statement that *We have a very queer dean* (*a very dear Queen*); while the speaker who converted *little ditches branching off* into *little britches dancing off,* departed from strict linguistic interchange by the logical attractions of *dancing* (it should have been *danching*).

It is to be noted that most of these lapses are peculiar to speech (vocal utterance), because this is the more fluent, more automatic expression; and further that these speech-lapses are apt to be favored by any slight indisposition or fatigue or excitement. One collector of such linguistic frailties notes that they occur more frequently at the end of an evening's conversation than at the beginning. Certain of the lapses are characteristically oral; a smaller class graphic; still others common to both forms of expression; while even in that half-innervated process of reading to one's self, or formulating one's thought in words (as in preparing for an address) do these lapses become cognizable to the semi-articulate consciousness. The lapses of writing are both less frequent and simpler than those of speech, because in writing we proceed by smaller units, and write as a rule with more alert attention than we give to casual talk or even to careful utterance. Graphic lapses will accordingly be apt to occur in rapid and absorbed composition in which thought runs well ahead of execution, or will occur in ordinary writing and be slight in character.[4] By virtue of the same relations, the more poised temperaments and deliberate speakers on the one hand, and those whose expertness in speech does not permit them so readily to commit execution to subconscious guidance (children and the uncultivated) on the other, will not be as subject to speech-lapses as the more fluent and venturesome speakers. Lapses of speech, like lapses of conduct, are favored by that inattention which we are disposed to give to ingrained and well-habituated activities.

Interrupting the taking of testimony at this point to interpret the evidence, it is obvious that these lapses follow definite trends, illustrative of our psycho-linguistic mechanism. Both anticipated and per-

[3] This suggests the placing of the wrong arm first into the sleeve, with a consequent awkward feeling; or the exchange of hats without observing the absence of the familiar recognition-marks.

[4] The typewriting manipulations have an appreciably different status from those of writing, notably in the number of separate mechanisms (fingers) that each may participate in the reaction; yet typewriter lapses are common, and in part conform to the linguistic types. Letter interchange is decidedly the most frequent slip (*rt* for *tr*, *oi* for *io*, etc.), though the other formulæ also apply.

sistent and interchanging parts of words, and parts of phrases, yield to confusion because of the psychological equivalence of the confused portions. Such equivalence of value or function in the attentive consciousness of the sentence-builder is determined by many considerations. Similarity of sound; similarity of stress; similarity in the syntax of phrases; similarity of position; similarities due to subjective attitudes—all enter in separate or combined form. Most conspicuous are confusions of the initial sounds of words; those for the leading words in the sentence receive about the same prominence of emphasis; thus *corch* and *pool, noyful* and *joise, watter* and *wetter.* The reader need only reread the series of lapses just recorded, with his attention directed to the relative balance or equivalence of the confused sounds and words, to find convincing proof of the parallelism that determines such confusion. There is even a slight advantage in taking foreign sounds in which, with the meaning less prominent, the sound-values to our apperception stand out more conspicuously. We can appreciate how readily *Alabasterbüchse* becomes *Alabüchsebaster* (interchange), or *Alabasterbachse* (persistence), or *Alabüsterbüchse* (anticipation); while *Paprikaschnitzel* not only emerges as *Piprikaschnatzel* and the other variants, but is even recorded as being contorted into *Schniprikapatzl.* When, however, *fröhliche Festfeier* emerges before the astonished hearers as *Festliche Fressfeier,* one appreciates that the accidental pertinence of the result may have been a still deeper subconscious inducement to attract the utterance into the form that likewise meets the linguistic expectations.

What all this means in terms of psychological processes is that the constructive consciousness requires and utilizes the marginal areas that spread to either side of the progressive focus of utterance. The wider this span, the greater the area within which confusion is possible. Ordinarily lapses are confined to elements close to the central moment; occasionally they extend to the next line or the next measure of thought, while in leading up to a climax, the speaker maintains a distant subconsciousness thereof and occasionally betrays the fact by an inadvertent precipitation of what was to have been the final triumphant flourish. Quite the same relation holds within the sentence when it is a long and complex one. The German construction has an unenviable reputation in this respect, and certainly makes strenuous demands upon the architectural skill of the sentence-builder; the inclusion and sub-inclusion of phrase within phrase, each with rigidly regulated gender and case and mood and tense forms, the distant relations of the parts of the separable verbs, and the final mood and tense auxiliaries that must ever be held in mind to round up the series of grammatical obligations incurred *en route,*—these demand a wide and alert spread of consciousness and permit of little loitering by the wayside.

A proficiency in subconsciously finding words for a thought already formulated, while at the same time shaping the next thought-period in conscious preparation, is a gift of prime importance to writer and speaker alike. It reaches a most developed application in dictating for publication. A remarkable talent of this type is ascribed by his amanuensis to Sir Walter Scott. He records that Sir Walter would continue to dictate while he searched for a book, found the desired passage, and absorbed its meaning. He thus kept going two trains of thought, the one arranged and ready to be spoken, and the other in logical preparation. "This I discovered by his sometimes introducing a word which was wholly out of place—*entertained* instead of *denied*, for example;—but which I presently found to belong to the next sentence, perhaps, four or five lines further on, which he had been preparing at the very moment he gave me the one that preceded it."

The intricate art of speech thus proceeds—though naturally with the subconsciousness begot of familiarity—by a preliminary projection, an outline staking of the sentence, not yet setting words in place, but mentally mapping their positions; then by the actual setting of the corner-posts and the raising of the framework upon these supports, the two proceeding together with an accompanying preparation for the details, that in due sequence enter into and embellish the complex structure. Yet the architectural, designing or constructive simile is inadequate, because the two procedures are so inextricably dovetailed, because each section receives its plan, foundation, details and finish in one. For the weaver of words does not, like the spider, send out—except in this provisional mental planning—the main radial lines of his web, and then take up in order the cross-threads from segment to segment; rather does the whole, mainrib and cross-lines, develop progressively as the thought finds expression in orderly sentences. He accomplishes this feat by the support of subconsciously delegated functions, that reflect years of trained experience, and cooperate with consummate skill, and ordinarily with no subordinate intrusions, in the centrally directed purpose.

We resume the survey of speech-lapses by observing another group, that suggests the confusions of conduct that occur in the abstracted handling of material situations. They have been called contaminations, coalescences, fusions and the like. They lay bare the subconscious alternatives from among which consciousness ordinarily selects properly the one chosen from the several called, but in this exceptional instance allows the submerged factor to project above the surface. Upon being asked whether she had heard a certain musical composition, a young lady had in mind to answer that she had heard *scraps* of it, or again that she had heard *snatches* of it, but actually said that she had heard *scratches* of it; with *rubbers* in the background of the mind,

overshoes became *ruvvershoes.* With *spank* in mind, the threat to paddle the refractory youngster became, *Well, I'll spaddle you;*[5] and a too hesitant wavering between *it mists* and *it drizzles* resulted in *it mizzles.* Unexpectedly lucid is the betrayal of an after-dinner speaker who planned to begin, *unprepared as I am* (*Unvorbereitet wie ich bin*), but had as a fact carefully rehearsed his part, and who actually said, *unprepared as I have myself* (*Unvorbereitet wie ich mich habe*).[6] Choosing between *Scherz* and *Spass,* the speaker said *Das ist kein Sperz,* just as we might say, That is no *jost* (*jest* and *joke*). Wishing to impart the information that he was at home until seven o'clock, and that indeed he was writing until that hour, the speaker said (and might just as well have written), *I was at home until seven o'clock was I writing.* The process has been graphically presented by indicating by the heavy line the above-the-threshold processes, and by the dotted line the sub-threshold impulses, the crossing point being the point of intrusion of the one into the field of the other.

Or thus:

The fact that we carry on a manifold activity in the expression of thought is thus sufficiently indicated, and finds marked parallelism, so far as the lapses are concerned, in the interchange of activities (the

[5] Nonsense word makers (Lewis Carroll, Edwin Lear, *et alii*) seem to be guided by a feeling for this process, along with many other more fanciful and onomatopoetic attractions. *The Hunting of the Snark* may have a suggestion of a *snake* and a *shark; Torrible Zone* suggests *torrid* and *horrible; slithy* may be *slimy* and *writhy.* Yet these verbal acrobatics naturally involve, as well, any forms of contortion that give amusement and the sound-semblance of sense. Lewis Carroll's own characteristic elucidation is as follows: "For instance, take the two words *fuming* and *furious.* Make up your mind that you will say both words, but have it unsettled which you will say first. Now open your mouth and speak. If your thoughts incline ever so little towards *fuming,* you will say *fuming-furious;* if they turn, even by a hair's breadth, towards *furious,* you will say *furious-fuming;* but if you have that rarest of gifts, a perfectly balanced mind, you will say *frumious.*"

[6] I am assured that there is a tendency among the philologists to account for the paradoxical use of the negative and the intrusion of the negative in constructions in which it seems logically out of place, by this process of heading for the gateway of utterance with a double team, only one member of which can and should get through; it is as though the one that succeeds takes with it the harness of the other. The Frenchman seemingly has in mind to say both *I fear my father will see me,* and simultaneously *I hope my father will not see me;* and actually allows himself to say *I fear my father will not see me.* Similarly, with *John is taller than James* in mind, but also thinking the same thought as *James is not as tall as John,* the spirit of the Romance language constructions tolerates *John is taller than James is not.* Independently of the proof that may be brought to bear upon the correctness of this suggestion, it is interesting to consider whether the mental tendency, that gives rise to lapses of speech, may not also have been influential in shaping linguistic construction and usage.

dipping of the brush into the ink, the handling of a key taken from the supposed stamp-box as though it were a postage stamp, the attempt to thread a thimble) induced by moments of abstraction; while the parallelism is completed when one or other of the commissions charged upon the mind emerges into utterance at the wrong occasion, and the preoccupied shopper asks the post-office clerk for *individual salt-cellars* instead of *stamps,* because that item is next on her list of commissions. A similar verbal interchange occurs when the absent-minded professor, in writing a testimonial, records that "Mr. A. has attended my *remarkable* lectures in chemistry with *inorganic* assiduity"; or asks at the toy-shop "for a *two-year-old* book for an *indestructible* child."[7] One may experimentally induce these intrusions by giving the mind two occupations, or exposing it to two sets of influences at the same time. In writing on one topic while thinking of another, or while listening to conversation, one may find in his written words some that found origin in, or were altered by what he heard, or by what became intruded into his writing from his extraneous meditations. A single instance: a clerk writing a pass for an employee while engrossed in the shipping of cylinders, writes *From Lima to Cylinder* instead of *From Lima to Dayton.* It is a familiar experience for teachers, in asking a question, with the answer prominent in consciousness, inadvertently to use the answer in framing the question.

The intrusion of the subconscious thus becomes a widely available formula to account for verbal as well as material slips of pen and tongue and hand; and the tendency to such lapses takes one of several distinctive forms, increasing with the similarity or suggestiveness of the confused situations, and most of all dependent upon the way in which the parts of the complex occupation lie in the mind, upon the momentary diversion of the attention from the central occupation, and everywhere upon the temperament and attentive habit of the subject. In these aspects, both in their larger features and with unexpected parallelism in detail, do the lapses of speech exhibit close analogies to the more general failures of adjustment in conduct of various types, that have in common with speech lapses the combined conscious and subconscious expression of reflection and intent.[8]

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[7] I can not extend the survey to take account of the distinctive lapses of thought, which, in common with the lapses considered, involve the formulation of a fairly definite thought that uncritically reaches expression in words, which amusingly or significantly miss or distort the intention. Such is the reply of the excited old soldier to the presentation of a sword upon an anniversary occasion: 'This sword, gentlemen, is the proudest moment of my life.' A survey of such lapses of thought, for which (though not for these exclusively) we have the special term 'bull,' would introduce more intricate yet related considerations.

[8] See 'The Lapses of Consciousness' in the POPULAR SCIENCE MONTHLY for October, 1905.

WHAT IS SLANG?

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TO the purist slang is an unmitigated evil which makes for the gradual corruption and decadence of our vernacular. The pedant who is a martinet regards all slang with absolute contempt and abhors its use, because he believes slang spells deterioration for our noble tongue. Such a one takes his self-appointed guardianship of the language very seriously and deems it his bounden duty as a curator of our English speech, not only himself to spurn the use of slang, but also to inveigh against all those who employ it habitually or occasionally. The baneful influence of slang, he tells us, is sweeping like a mighty tidal wave over the English language, debasing it and corrupting its very sources.

Nor is the precisionist alone in entertaining this alarming view. For many others who are not sticklers for strict propriety and correctness of speech share, to some extent, the same opinion, although they feel no special concern as to the final outcome. However, it is reassuring to reflect that the best-informed among us and those whose thorough knowledge entitles them to speak with authority do not take so gloomy and pessimistic a view of the future of the English language. They inform us that the fears of the pedants and pedagogues—the half-educated—are never destined to be realized.

"Strictly speaking," says Professor Lounsbury, than whom there is no higher authority in America on the history of English, "there is no such thing as a language becoming corrupt. It is an instrument which will be just what those who use it choose to make it. The words that constitute it have no real significance of their own. It is the meaning men put into them that gives them all the efficacy they possess. Language does nothing more than reflect the character and the characteristics of those who speak it. It mirrors their thoughts and feelings, their passions and prejudices, their hopes and aspirations, their aims, whether high or low. In the mouth of the bombastic it will be inflated; in the mouth of the illiterate it will be full of vulgarisms; in the mouth of the precise it will be formal and pedantic. The history of language is the history of corruptions—using that term in the sense in which it is constantly employed by those who are stigmatizing by it the new words and phrases and constructions to which they take exception. Every one of us is to-day employing expressions which either outrage

the rules of strict grammar, or disregard the principles of analogy, or belong by their origin to what we now deem the worst sort of vulgarisms. These so-called corruptions are found everywhere in the vocabulary, and in nearly all the parts of speech."

Yet the feeling of the pedants and purists reflects the traditional attitude of professional men of letters in respect to the so-called corruptions that have been creeping into English during the last few centuries. It may be worth while to give some of the utterances of our representative English authors on this subject, showing how great solicitude they felt for the purity of our language in consequence of the increasing slang introduced into English. But before doing this, let us make a brief digression, in order to discuss what is meant by slang, which appears to be the source of the alleged corruptions of our speech.

In the first place one must differentiate slang from cant. It is evident, on a careful analysis, that much of the reputed slang now current is really cant, not slang, in the proper sense of the term. Both cant and slang are closely allied and have a kindred origin. This is the reason for the confusion of the two in the popular mind.

Cant is the language of a certain class or sect of people. It is the phraseology, the dialect, so to say, of a certain craft or profession and is not readily understood save by the members of the craft concerned. It may be perfectly correct according to the rules of grammar, but it is not perfectly intelligible and is not understood by the people. It is an esoteric language which only the initiated fully comprehend and are familiar with. For example, the jargon of thieves is called cant, as is also the jargon of professional gamblers. Slang, on the other hand, belongs to no particular class. It is a collection of words and phrases, borrowed from whatever source, which everybody is acquainted with and readily understands. It is not uncouth gibberish intelligible only to a few. It is composed of colloquialisms everywhere current, but homely and not refined enough to be admitted into polite speech. Such expressions may be allowed a place in certain departments of literature, as familiar and humorous writing, but they are objectionable in grave and serious composition and speech.

Now, slang is reputed to have had its origin in cant, specifically 'thieves' Latin,' as the cant of this vagabond class is called. Indeed, this appears to have been the only meaning of slang till probably the second quarter of the last century. In 'Red Gauntlet,' published in 1824, Scott refers to certain cant words and 'thieves' Latin called slang'; and the great romancer seems to have been fully aware that he was using a rather unknown term which required a gloss. Sometime during the middle of the last century, so Professor Brander Matthews informs us, slang lost this narrow limitation and came to

signify a word or phrase used with a meaning not recognized in polite letters, either because it had just been invented or because it had passed out of memory. If it is true that slang had its beginning in the *argot* of thieves, it soon lost all association with its vulgar source, and polite slang to-day bears hardly a remote suggestion of the lingo of this disreputable class. In so short a period—but little more than a half century—has the word, as well as the thing it signifies, separated itself from its unsavory early association and worked its way up into good society.

Of slang, however, there are several kinds. There is a slang attached to certain different professions and classes of society, such as college slang, political slang and racing slang. But it must be borne in mind that this differentiation has reference to the origin of the slang in the cant of these respective professions. It is of the nature of slang to circulate more or less freely among all classes of society. Yet there are several kinds of slang corresponding to the several classes of society, such as vulgar and polite, to mention only two general classes. Now, it is true of all slang, as a rule, that it is the result of an effort to express an idea in a more vigorous, piquant and terse manner than standard usage ordinarily admits. In proof of this it will suffice to cite *awfully* for *very,* employed by every school-girl as 'awfully cute'; *peach* or *daisy* for something or some one especially attractive or admirable, as 'she's a peach'; *a walk-over* for any easy victory, *a dead cinch* for a surety, and the like. But it is not necessary to multiply examples of a mode of expression which is perfectly familiar to all. Every man's vocabulary contains slang terms and phrases, some more than others. Often the slang consists of words in good social standing which are arbitrarily misapplied. For although much current slang is of vulgar origin and bears upon its face the bend sinister of its vulgarity, still some of it is of good birth and is held in repute by writers and speakers even who are punctilious as to their English. Some slang expressions are of the nature of metaphors, and are highly figurative. Such are *to kick the bucket, to pass in your checks, to hold up, to pull the wool over your eyes, to talk through your hat, to fire out, to go back on, to make yourself solid with, to have a jag on, to be loaded, to freeze on to, to freeze out, to bark up the wrong tree, don't monkey with the buzz-saw,* and *in the soup.* But of the different kinds of slang and of its vivid and picturesque character more anon.

Let us now, after this digression as to what constitutes slang, return to the former question of the historical aspect of slang, which was engaging our consideration. Though the name is modern, slang itself is, in reality, of venerable age, and was recognized in the plebeian speech of Petronius, the Beau Brummel of Nero's time, whose 'Trimalchio's Dinner' is replete with the choicest slang of the Roman 'smart set.'

The humorous pages of François Rabelais, also, have a copious sprinkling of slang expressions and invite comparison with the productions of some of our own American humorists, who depend not a little upon the vigorous western slang to enhance the effectiveness of their humor. But it is more to the point to cite historical instances among our English authors, especially those who set themselves the burdensome, yet thankless, task of striving to preserve the primitive purity of our speech.

The greatest representative of this number in English literature, excepting Addison, is Swift, the famous dean of St. Patrick's. He was impelled by a desire amounting almost to a passion, it is said, to hand down the English language to his successors with its vaunted purity and beauty absolutely unimpaired. In an essay in *The Tattler* of September 28, 1710, he gives vehement utterance to his feelings on the shocking carelessness and woeful lack of taste in the use of the vernacular exhibited by his contemporaries. He affirms that the conscienceless, unrefined writers of his day were utterly indifferent as to the effect of their deplorable practise upon the future of the English tongue and brought forward, in proof of his contention, numerous examples of solecisms which he alleged were constantly employed, to the corruption and deterioration of the language.

Swift made a threefold division of the barbarous neologisms which were introduced in his day. It is interesting to observe his several classes of these locutions that were contrary to all rules of propriety. The first class was made up of abbreviations in which only the first syllable or part of the word had to do duty for the entire word, as *phiz* for *physiognomy, hyp* for *hypochondria, mob* for *mobile vulgus, poz* for *positive, rep* for *reputation, incog* for *incognito* and *plenipo* for *plenipotentiary.* The second class included polysyllables, such as *speculations, battalions, ambassadors, palisadoes, operations, communications, preliminaries, circumvallations* and other ungraceful, mouth-filling words, which Swift alleged were introduced into the language as a result of the war of the Spanish succession then in progress. His third class embraced those terms which were, to quote his own words, 'invented by certain pretty fellows, such as *banter, bamboozle, country put* and *kidney.*' "I have done my utmost," he pathetically remarks, "for some years past to stop the progress of *mobb* and *banter,* but have been plainly borne down by numbers and betrayed by those who promised to assist me."

Two years later Swift addressed a public letter to the Earl of Oxford, the Lord High Treasurer, deprecating the approaching decadence of the English tongue and earnestly urging some sort of concerted action for correcting and improving the vernacular. The language, the letter recited, was very imperfect and daily deteriorating. The period of its greatest purity, Swift went on to say, was that from

the beginning of Queen Elizabeth's reign to the breaking out of the civil war of 1642. His perturbed mind was filled with mingled feelings of grief and indignation as he pointed out in this letter the growing corruptions then so apparent even in the writings of the best authors, and more especially as he was compelled to admit that not only the fanatics of the commonwealth, but also the court itself, had contributed to bring about the sad condition of the language.

It is not worth while to speak in detail of Swift's fanciful and quixotic scheme for purging the language and keeping it pure. But it is interesting to observe, in passing, that his urgent appeal to the prime minister to become the guardian and curator of the English tongue was utterly fruitless and, what is more, that his direful predictions as to the speedy decay of English have never been verified. Furthermore, some of those very neologisms which Swift criticized so unrelentingly are now recognized in polite speech and bear the stamp of approval as the *jus et norma loquendi*. Of his second class of barbarisms well-nigh all are to-day accepted as standard English and are without a trace of slang. With his first and third classes, however, fate has not dealt so kindly, for these words are still under condemnation, save *mob*, which has forced its way to recognition in good usage as a necessary term.

Toward the end of the eighteenth century appeared another champion of the preservation of the purity and propriety of the English speech. This was James Beattie, a learned Scotchman. For some reason or other, the Scotch seemed extremely solicitous about the English language during the eighteenth century—a solicitude that was not appreciated by the British lexicographers and least of all by Dr. Johnson. In a letter written in 1790, Beattie took occasion to speak of the 'new-fangled phrases and barbarous idioms that are now so much affected by those who form their style from political pamphlets and those pretended speeches in Parliament that appear in the newspapers.' "Should this jargon continue to gain ground among us," he assures his correspondent, in a doleful mood, "English literature will go to ruin. During the last twenty years, especially since the breaking out of the American war, it has made alarming progress. . . . If I live to execute what I purpose on the writings and genius of Addison, I shall at least enter my protest against the practise; and by exhibiting a copious specimen of the new phraseology, endeavor to make my reader set his heart against it."

In order to emphasize the damage resulting to the language from the neologisms which were creeping in, Beattie conceived the clever plan of privately printing a series of 'Dialogues of the Dead,' which purported to be the production of his son deceased a few years before. The most interesting of these 'Dialogues' is the report of an imaginary

conversation between Dean Swift, a bookseller and Mercury, in which the worthy dean expresses himself as greatly shocked and disgusted at the outlandish English used by the bookseller; and he calls on Mercury to translate the *patois* into good English. In response to Swift's earnest request, Mercury says among other things: "Instead of *life, new, wish for, take, plunge,* etc., you must say *existence, novel, desiderate, capture, ingurgitate,* etc., as—a fever put an end to his existence. . . . Instead of a *new* fashion, you will do well to say a *novel* fashion. . . . You must on no account speak of *taking* the enemy's ships, towns, guns or baggage: it must be *capturing.*" Other words which were censured as improper by this phantom critic were *unfriendly* and *hostile* for which *inimical* was recommended; *sort* and *kind,* in place of each of which *description* was to be used. Some of the locutions then in vogue which especially offended good taste, according to Beattie, were *to make up one's mind, to scout the idea, to go to prove, line of conduct, in contemplation,* and *for the future.* Furthermore, the frequent use of *feel,* which threatened to supplant the verb *to be* in such an idiom as 'I am sick' and drive it from its rightful domain, aroused the learned Scotch purist's apprehension as to the final outcome, as did also the growing tendency to employ *truism* for *truth, committal* for *commitment, pugilist* for *boxer, approval* for *approbation* and *agriculturist* for *husbandman.*

No doubt Beattie believed with Swift that the influx of such pedantic Latinisms as *desiderate* and *ingurgitate* and the like would result in impairing the purity of our speech and perhaps hasten its declension. Nor did he look with favor on the growing fashion to use monosyllables, though of pure Saxon origin, so much affected by some writers during that period. Both of these tendencies were of temporary vogue; yet they served to arouse the fears of the ultra-conservatives as to the fate of the English language. One might suppose that, dreading the then threatening invasion of Latin terms as they clearly did, they would have hailed with delight the revival of Saxon monosyllables as a favorable offset. But even this did not allay their fears and was rather interpreted as a harmful symptom. Time, however, has demonstrated fully that the fears of those purists were unwarranted and that their dire predictions as to the future of English were founded on a very imperfect knowledge of linguistic development. A cursory examination of Beattie's lists reveals the fact that of the verbal innovations and offending phrases which he put under the ban, the genius of the language has adopted not a few, and that, too, without impairing in the least the purity of the English tongue or its capacity for expressing the finest shades of thought. So far from losing, the language has gained in its capacity for expressing nice distinctions of thought and feeling, as a result of its marvelous absorptive power.

It has thus been shown that in the eighteenth century there were not wanting those—purists or what not—who entertained and expressed no little concern as to the ultimate effect upon our speech of the multitude of neologisms and asserted improprieties that were introduced. Did space permit, utterances of a similar character by nineteenth-century writers, from Walter Savage Landor down to critics of far less renown, might be brought forward as evidence to show that the watchdogs of our speech were as numerous and as alert as ever. Nor is their tribe yet extinct. Ever and anon, even in the last few years, some prophet of evil is heard to raise his voice in vigorous protest against the increasing use of slang as foreboding the decadence of our vernacular. But the warning is not heeded; and the English language, like the real living thing that it is, goes on developing according to the subtle principles of speech development.

The laws governing speech development are very imperfectly known. Consequently none can foretell how a given tongue may develop. The language appears to be independent of one's individual habit of speech; yet it is the sum total of the individual habits of speech that constitutes the language. No man makes a language; no man can make it. Not even the greatest monarch on earth can, by decree or fiat, predetermine the course of development of the language of his subjects. Language is an involuntary product and does not result from any determined concert of action. Yet it is modified and changed by various influences. As long as it is alive and spoken, it is constantly changing and will not remain 'fixed' according to the whimsical desire of the purist. When it ceases to be used upon the lips of the people as a medium of communication of their thoughts and feelings, then it will cease to change and grow and will become 'fixed.' But when a language is no longer spoken, it is characterized as dead. It is in this sense that we call Latin and Greek dead languages, although they survive in modern Italian and modern Greek, respectively.

It follows, therefore, that it is the height of folly for any one, no matter how highly esteemed as an author, to attempt the rôle of reformer of the speech. Such an one is destined to have only his labor for his pains. He can not directly purge the language of its neologisms and improprieties of usage. These violations of standard usage which offend good taste, strange as it may seem, furnish indubitable evidence of the vitality of the speech; for from these contraband expressions come the new terms and idioms which are to take the place of the obsolete words which drop out of the vocabulary.

Viewed in this light, slang assumes a different aspect, and it becomes evident that it performs a certain necessary function in the development of language. It is no longer proper, therefore, to refer to slang with supreme contempt and to condemn it offhand as an un-

mitigated evil which ought to be forthwith extirpated from the language. For, as an eminent authority has observed, slang is the recruiting ground of language and is, in reality, idiom in the making. It has been pointed out how some of the slang expressions of the eighteenth century which fell under the censure of Swift and Beattie are now found upon the pages of our best authors and are heard upon the lips of our most polished and elegant speakers. Since this is true, no verbal critic can at the present time affirm of a polite slang expression now in vogue that it is destined never to work its way up into good usage, or of a foreign locution that it will never be domiciled in our speech. Nor can he determine, in the case of a new coinage which is a candidate for adoption into the literary language, just when it is taken over from that doubtful borderland between slang and standard usage.

Seeing, then, that slang really has a function to perform in the growth of speech and, therefore, that it is worthy of serious consideration, let us examine some of our modern English slang and study for a short while its origin and history.

Professor Brander Matthews, in an admirable paper on the subject, divides slang into four classes, and we can hardly do better than to follow his general classification. The first class embraces those vulgar cant expressions which are the survivals of thieves' Latin or St. Giles' Greek, and those uncouth, inelegant terms which constitute the vernacular of the lower orders of society. This is the kind of slang heard in the police courts, the kind the newspaper reporter too frequently resorts to, in order to give spice to his account. It has been introduced into literature by some of our recent novelists, notably Dickens. The second class of slang is not quite so coarse, and includes those ephemeral phrases and catchwords which have a fleeting popularity and which, because they meet no real need, are soon forgotten utterly. They live but a day and pass away, leaving behind no trace of their existence. Of this class are campaign slogans and such inane expressions as *where did you get that hat? chestnut, rot, I should smile* and many others equally stupid. It is these two classes of slang that have brought the term into disrepute and merited contempt. For this sort of slang is very offensive to delicate ears and justly deserves the speedy oblivion which overtakes it.

The other two classes of slang, on the contrary, are of a finer type and have a reason for their being, something to commend them to popular favor. It may well be that from this type new idioms and phrases are recruited into our literary language. However, a certain stigma attaches to this better variety of slang, also, in the judgment of many, simply because it is slang. Yet it is heard on the lips of educated and cultured speakers, much to the disgust of those who are fastidious as to the propriety of usage. When it is employed in the

written speech, the more careful writers brand it with inverted commas, the barbarian earmarks which attest its social inferiority. Occasionally a bold writer like Mr. Howells breaks down these barriers which convention has set up and gives a polite slang expression the stamp of his approval and authority. In this way these social outcasts, the pariahs of our literary speech, are now and then elevated to the dignity and rank of good society, and finally establish themselves in standard English.

Of these two classes of slang serving some useful end as feeders to the vocabulary and idiom of our language by which its wasting energy is to be repaired, the first embraces those archaic phrases and terms which are revived after long disuse and again brought into service. Restored after several generations of neglect, they now appear to be entirely new coinages and are only received as other probationers. The second class is composed of absolutely new words and expressions, frequently the product of a happy invention and, generally, racy and forceful. As instances of the first class may be mentioned *to fire,* in the sense to expel forcibly or dismiss, *bloody* in the sense of very, *deck* in the sense *pack* of cards and similar historic Elizabethan revivals. Such locutions have a good literary pedigree, now and then boasting the authority of Shakespearean usage. But this is not always apparent and such long-obsolete phrases are, therefore, accounted mere *parvenus.* For example, in King Henry VI. we read:

> **Whiles he thought to steal the single ten,**
> **The king was slily fingered from the deck.—3 Pr., v. 1.**

and again in Shakespeare's 144th sonnet:

> **Till my good angel fire my bad one out.**

The vulgar *bloody,* more common in England than in America, is an inheritance from the classic age of Dryden, who even uses the coarse phrase 'bloody drunk' in his Prologue to 'Southerne's Disappointment.' Swift furnishes a slight variation from this in 'bloody sick,' occurring in his 'Poisoning of Curll.' The more fruitful province of polite slang is the second class which is made up of the clever productions of the present age. It is from the best of these coinages, above all, that the worn-out energies of our vocabulary and idiom are repaired. These raw recruits of slang are severely disciplined and tested by hard preliminary service. If in this test an individual slang expression proves useful and is seen to fill an actual need, it is admitted eventually into the fellowship of standard English. But if, on the other hand, its utility is not established, it is relegated to the limbo of useless inventions where oblivion soon engulfs it.

Let us now review a few specimens of the best type of our modern slang. But perhaps it is safer simply to mention the alleged slang

and not undertake to decide which of these expressions are slang and which standard English. For it is no easy matter to trace the line of cleavage between the legitimate technicality of a given craft or profession and polite slang. For instance, are *corner, bull, bear* and *slump,* so familiar in financial parlance, mere technical phraseology or slang? How is one to classify such political terms as *mugwump, buncombe, gerrymander, scalawag, henchman, log-rolling, pulling the wires, machine, slate* and *to take the stump?* If these are mere technical terms, surely *boycott, cab, humbug, boom* and *blizzard* have passed beyond the narrow bounds of technicality and are verging on that dubious borderland between slang and standard English. Furthermore, are *swell, fad, crank, spook* and *stogy* to be considered slang or good English? Each of these terms is supported by the authority of some of our best writers. *Swell,* to cite only one example, is bolstered up by the authority of Thackeray, who in his 'Adventures of Philip' writes: 'They narrate to him the advent and departure of the lady in the swell carriage, the mother of the young swell with the flower in his buttonhole.' Again, how is one to regard *fake, splurge, sand, swagger, blooming* (idiot), *to go it blind, to catch on,* and that vast host of similar racy and vivid phrases which, if slang, still do duty for classic English in common parlance?

A glance at some of our slang idioms shows that they are borrowed from the cant of various crafts and callings. Some are borrowed from the technical vocabulary of the stage, some are taken over from the phraseology of sporting life, while some bear the stamp of various other vocations. Take as an illustration *fake,* or, better still, *greenhorn,* which has forced its way to recognition in standard English. At first *greenhorn* was applied figuratively to a cow or deer or other horned animal when its horns are immature. In the 'Towneley Mysteries' it is applied to an ox, for example. Later it was extended to signify an inexperienced person, or one who, from lack of acquaintance with the ways of the world, is easily imposed upon. The former application where the term was used in allusion to an immature horned animal is a legitimate metaphor. The latter use when applied to an inexperienced person was doubtless recognized as an extension of the metaphor and as slang. But the word filled a need in the vocabulary and was at length admitted into the guild of good usage. Another illustration is furnished by *mascott,* a recent importation from the French. This word originated in gambler's cant and signified a talisman, a fetish, something designed to bestow good luck upon its possessor. The term, despite its unsavory association, somehow has commended itself to popular favor and now seems not to offend the most refined taste. *Slump,* though not so hackneyed, may serve as an example in point also. As a provincialism this word denotes soft

swampy ground, or melting snow and slush. Later by transferred meaning it came to characterize in the financial world the melting away of prices, as a slump in the market—a vivid picture which is more interesting as a linguistic phenomenon than as an actual fact.

The history of slang teaches that words, like people, may be divided into two general classes, high and low, or refined and uncouth. "In language as in life," as Professor Dowden puts it, "there is, so to speak, an aristocracy and a commonalty, words with a heritage of dignity, words which have been ennobled, and a rabble of words which are excluded from positions of honor and trust." Now, some writers select only the choice and noble words to convey their ideas, leaving the coarse and vulgar words, terms without a pedigree, as it were, in the bottom of the inkhorn, for those who desire them. Other writers again have less cultured tastes and do not scruple to employ now and then plebeian words, to set forth their thoughts and feelings.

One might suppose on first blush that the dictionary ought to be a safe guide in the choice of words. A moment's reflection, however, is sufficient to convince one that the dictionary can not be relied upon always for this desired knowledge. It is the lexicographer's office to make a complete register of the vocabulary of the language; and so, to make his work exhaustive, he frequently records many slang words in his dictionary. Yet the practise of our dictionary-makers, it must be admitted, varies widely in this respect, some being far more exclusive than others. Our former lexicographers, as for instance Doctor Johnson, exercised a stricter censorship than is the custom at present. But it is not correct always to infer, in the case of an unrecorded word of questionable usage, that the author excluded it of set purpose. It may possibly be omitted from oversight. It seems to be the custom of our lexicographers now to make as complete a record as possible of all polite slang, but to brand it 'slang.' This plan is, of course, altogether distasteful to the pedants and pedagogues who make a fruitless effort to curb and check the vocabulary of a language by rejecting all words of questionable usage. Whatever is not in harmony with established usage, whatever is not authorized by standard speech, the pedants and half-educated utterly reject. Now, heretofore our dictionary-makers have not been entirely above and beyond this narrow and circumscribed view. It was this fact that prompted Lowell, in the preface to his famous 'Biglow Papers,' to express himself in these vigorous words: "There is death in the dictionary; and where language is too strictly limited by convention, the ground for expression to grow in is limited also, and we get a *potted* literature—Chinese dwarfs instead of healthy trees."

The truth is, it does not fall legitimately within the province of the lexicographer to settle the question whether a polite slang term of

recognized fitness and utility should be deemed good English or not. No man, however competent a scholar he may be, has the right to determine the growth and development of our language. Yet such a practise means this in the last analysis. There are not a few words and idioms in English that have neither logic nor reason to commend them, but are the product of analogy, as *it, its* and *you,* instead of the strictly correct *hit, his* and *ye,* to use a familiar example; and yet these analogical formations, which at first were mere slang, long ago drove our proper pronouns from the field. This change took place in the last two or three centuries, and that, too, in the very face of the vaunted authority of Shakespeare and the King James Version. No doubt the pedants and purists opposed this change as utterly illogical and contrary to the natural order of development and growth of our English speech; but they were gradually borne down. It is the vast body of those who use the language, the people, not the lexicographers and scholars solely or chiefly, who are the final arbiters in a matter of this kind. It is the law of speech as registered in the usage of those who employ the language that decides ultimately whether a given phrase shall survive or perish; and this is done so unconsciously withal that the people are not aware that they are sealing the destiny of some particular vocable. This silent, indefinable, resistless force we call the genius of the language.

It is hoped that the spirit of this paper will not be misunderstood. The article, let it be distinctly and emphatically stated, is not intended as a brief for slang—far from it. It is written simply to call attention anew to the fact that slang is not to be absolutely condemned as the main source of corruption of our speech, as some assert, but that, contrariwise, it is an important factor in the growth of our vernacular and serves—at least the best of it—a useful purpose in repairing the resulting waste which necessarily occurs in English as in every spoken language.

RECENT ADVANCES IN METEOROLOGY AND METEOROLOGICAL SERVICE IN JAPAN

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TEN years ago, after Japan's sweeping victory over China, the world was awakened to realize that the Japanese were more than yellow barbarians. And only a score of months ago, when Japan made a declaration of war, Russia scoffed at Japan's overtures, and the world pitied her. To the American and the European eye, it seemed like simple suicide for Japan to go to war with the seemingly most powerful nation on the earth. The opinion that Japan would be wiped out of existence once prevailed even in well-informed military and naval circles. Japan has, however, crushed the faith and the fear. She has triumphed so completely that the world now recognizes that this nation possesses a great fighting power and mighty fighting machines. But how few, indeed, realize that, behind this warlike scene, our men of science are industriously and ingeniously attacking great problems of nature, making discoveries and inventions, valuable not only for warfare, but also for the welfare of humanity, and for the progress of science itself. Saying nothing of the knightly spirit of old Samurai, which has been the soul of Japan, the most important factor in the making of new Japan has been her readiness in scientific research and the applications of science to the arts of peace and war. Japan is preeminently a land of science. It is said that there are more people in Japan who read the books of Darwin and Huxley, Spencer and Mill, Faraday and Tyndall, than in England, the land where these great thinkers lived. "What will Japan do after peace is attained?" This question is often asked, and all intelligent Japanese will unanimously answer that "Japan will once more fight a great battle, not naval or military, but intellectual, for the recognition of her scientific achievements in the world."

Elsewhere I expect to give a full account of the recent progress of science in Japan, but my present task is an attempt to give, within a short space, some idea of the Japanese meteorological service* and recent advances in meteorology. One of the Washington newspapers stated some time ago that *even* Japan has a weather-bureau system.

* A full account of the Japanese Weather Service is given in the monograph, 'The Organization of Meteorological Service of Japan,' published by the Central Meteorological Observatory, 1904.

The fact is that the U. S. Signal Service, which was the forerunner of the present U. S. Weather Bureau, was established in 1870, and that Japan had, as early as in 1872, a meteorological observatory at Hakodaté, and the Japanese meteorological service was organized in 1875, the exchange of international simultaneous reports with the U. S. Signal Office of Washington having been established twenty-eight years ago. The organization of the Japanese Meteorological Service, however, was not completed until a system of weather telegraphy was inaugurated and weather maps with forecasts were printed in 1883.

The Meteorological Service of Japan is placed under the direction of the Central Meteorological Observatory and under the supervision of the Minister of State for Education; it maintains 134 meteorological stations, of which 70 are the provincial stations of the first order, 2 are attached to the Central Observatory, 7 are controlled by the Governor General of Formosa and the rest are the stations of the second order. All of these first and second stations send their meteorological reports to the Central Meteorological Observatory and exchange daily telegrams with the latter. Besides these, there are 1,214 stations of the third order which consists of village offices, district offices, police stations, schools, etc. Each is provided with a set of maximum and minimum thermometers, an ordinary thermometer, rain gauge, etc., and each observer makes daily observations at 10 A.M. (135th meridian time or 8 P.M. 75th meridian time). They send their reports by mail to the respective provincial stations to which they belong.

The stations of the first order make their observations every hour and those of the second order six observations daily. The principal instruments in use at a station are a standard barometer of the Fortin design; a portable mercurial barometer; a psychrometer of August's pattern; a standard thermometer (Cassella or Fuess); maximum and minimum thermometers (Fuess); Robinson cup-anemometer with electric contact device; a wind vane; a rain gauge; and an evaporometer. In addition to these instruments, the stations of the first order and most of second-order stations are furnished with solar radiation-thermometers, terrestrial radiation-thermometers, earth- thermometers for the depths of 0.0, 0.3, 1.2, 3.0 m., etc., and a seismograph of the Gray-Milne type. All these instruments are minutely examined and compared with the standard instruments of the Central Meteorological Observatory. The method of observation and reduction conforms strictly to the decisions of the International Meteorological Committee. The Abercromby-Hildebrandsson classification is adopted for the observation of cloud forms, and the International Meteorological Tables are used for the reduction of observations. For computation of humidity from psychrometric observations, Angot's tables are used. The provincial stations publish monthly and annual reports, and exchange their publications with one another. The employees of the stations

consist of the chief, the meteorologists, the assistants and the clerks. The chief and meteorologists are appointed with His Majesty's approval, and the assistants by the governor of the prefecture. Stations are inspected about once every three or four years by the staff of the Central Meteorological Observatory.

The Central Meteorological Observatory of Japan, which is situated at Tokyo, is the center of our meteorological service. Most of the important investigations are conducted by its staff either at this observatory or elsewhere. It is organized into four divisions: (1) cabinet of the director, (2) service of predictions, (3) service of observations and (4) service of statistics. The present director of the observatory is Professor K. Nakamura, D.Sc., a former student of Professor von Bezold at Berlin. The service of predictions has been for the last twenty-five years in the most able and experienced hands of Professor Y. Wada, who is now completing the organization of the similar meteorological service in Korea and Manchuria. Dr. T. Okada now succeeds Professor Wada as the chief of the service of predictions and Dr. W. Oishi is chief of the service of observations at the Central Meteorological Observatory.

The instrumental equipment of this observatory is so complete that it may well be called a meteorological laboratory. Here one can execute meteorological research in barometry, thermometry, hygrometry, nephoscopy, pluviometry, anemometry, actinometry and other lines. There are various instruments and apparatus for verifying the meteorological instruments that are to be distributed to all stations or elsewhere. The observatory also undertakes observations on seismic, magnetic and electrical phenomena. For seismometry, there are the Gray-Milne seismograph, the Ewing seismograph, Tanakadaté's seismograph, the Milne horizontal pendulum, the Omori pendulum. Seismic observation and study form an important feature in the meteorological service of Japan. Each station is equipped with a set of seismographs. Professor F. Omori, of the Tokyo Imperial University, is most active in seismological research, backed by the Imperial Earthquake Investigation Committee, which is composed of such eminent men as Baron Kikuchi and Professor Tanakadaté. For further information along this line of work, the reader should consult Baron Kikuchi's monograph, 'Recent Seismological Investigations in Japan,' which was originally prepared as an address to the International Congress of Arts and Science (in 1904) at St. Louis. For the measurement of atmospheric electricity, there are used at the Central Observatory Exner's portable electrometer, Mascart's self-registering electrometer, Kelvin's collector, etc. The hourly values of electric potential are published in the annual reports.

The periodic publications of the Central Meteorological Observatory are the daily weather-map, the monthly report, the annual report and the monthly weather review. In addition to these, the *Bulletin of the*

Central Meteorological Observatory is published in foreign languages. This contains the results of investigations of meteorological and allied problems.

Turning from the practical to the educational side of meteorology in Japan, we find that in the College of Science of the Tokyo Imperial University a chair for meteorology has recently been established in the department of physics. In the College of Agriculture of the same university Professor Diro Kitao has been giving excellent lectures on meteorology for the last twenty years. Lectures on the same subject are also given by Professor Goto at Tokyo Higher Normal School, by Professor Baba at Tokyo Navigation School, by Professor Y. Wada at the Naval School and by Dr. Inagaki at Moriaka Higher Agricultural School. It is also to be understood that meteorology is taught in all other schools of agriculture, navigation, commerce and technology, as well as in military and naval academies. At the Central Meteorological Observatory a temporary school is opened every year for the training of meteorological observers at provincial stations. The term of this school is usually six months, during which period are given courses of lectures on meteorology, seismology, physics, instruments and methods. This temporary school has been an important factor for securing a uniformity and a higher standard in the attainments of observers.

The most convincing evidence of the popular interest in our science is the fact that Japan has supported the Meteorological Society of Japan for more than twenty years. We understand that meteorology has no recognized place in such a popular gathering as the American Association for the Advancement of Science, and that the *American Meteorological Journal* was long since discontinued. The Meteorological Society of Japan is composed of two hundred and sixty-four active members, only three being honorary. This society publishes a monthly journal, partly in Japanese and partly in foreign languages. At its general meetings held annually in May meteorological papers are read and discussed.

So much for Japan's contributions to practical meteorology and its diffusion. Now let us examine what has been done by Japanese meteorologists for theoretical meteorology. Any one who has paid close attention to meteorology must be aware that the progress of this science lags far behind that of some other physical sciences. Within a century the world has seen astronomy, physics, chemistry and other well recognized sciences emerge from their previous uncertain and indefinite condition; but meteorology is at present inchoate, and its ascertained facts are too scanty to allow of organizing any system of fundamental principles. Fifteen years ago, von Helmholtz turned his attention to the hydrodynamics of the atmosphere, but, so far as meteorology is concerned, this great man left his work unfinished. Recently theoretical researches have been undertaken by von Bezold, Neuhoff, Brillouin, Pockels,

Margules, Sprung, Bjerknes, Bigelow, Wild, Pernter, Ekholm and many others. It appears, however, that not very much has been added to dynamic or theoretical meteorology since the publication of the works of Ferrel, Mohn and Oberbeck. The present status of the science being such in the professed countries of science, Japan can not be criticized if she has not done very much towards developing theoretical meteorology. She may, however, be proud of Professor Diro Kitao, a profound mathematician, and of his work, comparable with the elegant analysis of Oberbeck and Helmholtz, in fact, reminding us remarkably of the work of Kirchhoff. While Japan was still in the national turmoil of forty years ago, Diro Kitao was sent by the government to Germany for study. He went through the gymnasium at Berlin and studied mathematical physics at Berlin and Göttingen. After an absence of about sixteen years, he returned to his native land and in 1886 was appointed as professor of physics at the College of Agriculture of the Tokyo Imperial University. Professor Kitao has published many important memoirs, the most noteworthy of which is his 'Beiträge zur Theorie der Erdatmosphäre und der Wirbelstürme.' This work was published in three volumes, volume I. in 1887, volume II. in 1889 and volume III. in 1895, in the Journal of the College of Science of the Tokyo Imperial University. This most elaborate memoir covers some four hundred pages. On account of its great length and of its highly mathematical nature, it is impossible to reproduce here all its important results; but it may be worth while to give here the title of each part. The first volume contains the introduction and the discussions of hydrodynamic equations with consideration of the earth's rotation; the general differential equations for the motion of the atmosphere; the general relations between isodynamic lines, wind-directions and vortex-axes; space integration; the equations of atmospheric motions under special assumptions; vorticular motions of the atmosphere; circular cyclones and anticyclones (§ I.–VII.). The second volume, including § VIII.–XI., treats of a vortex field of rectilinear isobars; the formation of complex vortices in the atmosphere; special motions in a vortex-field; the change of wind-direction, strength and pressure for a given external point in the case of a double vortex formation. The third volume treats of the condition for a stationary vortex when two vortices exist; vertical atmospheric circulation; variable vortex formation in the atmosphere (§ XII.–XIV.).

Several important meteorological memoirs have been published, mostly by the members of the Central Meteorological Observatory. Among these we note 'Sur la marche diurne de la température de l'air,' by Nakamura; 'Studies on Atmospheric Electricity,' by Homma; 'Earth Temperature at Tokyo,' by Oishi; 'Température moyenne annuelle de la température de la mer dans l'Océan Pacifique Occidental,' by Wada. Okada has published several papers on the evaporation in

Japan, on the underground temperature at Nagoya and Osaka and on the thermal conductivity of snow. Among the papers officially published by the Central Meteorological Observatory are 'Typhoon of September 13–14, 1881'; 'Typhoon of September 26–27, 1881'; 'Forms of Clouds'; 'Some Researches on Agricultural Meteorology'; 'Typhoon Tracks in Japan'; 'Low Pressure in Japan'; 'Normal Pressure, Temperature and Rainfall in Japan,' etc. Since 1880 the Central Meteorological Observatory and some provincial stations have made several meteorological expeditions to high mountains in various parts of Japan to investigate the atmospheric phenomena and processes in the high strata. The results of these investigations have been published in several volumes. There may be, besides, many important meteorological papers and books written in Japanese that have not come to the notice of the present writer, who has been absent from the country for many years.

The preceding paragraphs show how excellent is the work that Japan is doing for the progress of theoretical as well as practical meteorology. A glance at a map of the Orient will clearly show how serious and difficult a matter it is to predict weather in Japan. Japan stands under the direct influences of the Pacific Ocean and the Asiatic continent, and also of the tropical and polar ocean currents, so that meteorological as well as climatic conditions in Japan are very complex. Very often a continental cyclone and a typhoon which, of course, comes from the tropics, pass through Japan simultaneously, thus bringing complexities to the weather. In spite of all these difficulties, storm tracks and other meteorological conditions have been very carefully investigated and the daily predictions that issue from the Central Meteorological Observatory are said to be most trustworthy. Our meteorological service has recently extended to Korea and China. Under the charge of Professor Y. Wada, five stations have just been completed in Korea, the Chemulpo Meteorological Observatory being the center of the system. Several stations have been established in Manchuria, and it is said that a large magneto-meteorological observatory is now planned to be established in Pekin by the government of Japan. As the writer has already described in *Science* (July 28, 1905), the establishment of the Mt. Tsukuba Meteorological Observatory by His Imperial Highness Prince Yamashina is another great advance. All these material items together with the alertness and native ability of Japanese meteorologists give assurance that she will make great contributions to the dynamics and physics of the earth's atmosphere and to the allied sciences in general.

WITH THE BRITISH ASSOCIATION IN SOUTH AFRICA.[1]

By PROFESSOR ERNEST W. BROWN,
HAVERFORD COLLEGE.

V.

PRETORIA, the capital of the Transvaal, presents the greatest contrast to its ambitious neighbor forty-five miles away. Although it is 4,500 feet above sea level, nearly the average of the rest of the colony, the hills which surround it give the impression of a rather low situation, but it loses nothing from the numerous blue gums, willows and other trees which are to be found everywhere in the city. The chief interest to a visitor naturally arises from its past history and its connection with the last president of the South African Republic. The fine Parliament House and Law courts are imposing beside the many one-storied houses which constitute the greater part of the town; near-by are Kruger's house and the church which he attended. In spite of the fact that Pretoria was down on the program only as an excursion from Johannesburg, its residents were not behind those of other towns in making hospitable arrangements for such as were able to take advantage of them; perhaps the most fully appreciated was a cross country 'Trek' to Mafeking which will presently be described.

A few miles to the north lies the new Premier Diamond mine, a wonderfully rich pipe of yellow, red and blue ground which a short time ago produced the largest stone ever discovered. It is less than three years since the place was bare rolling veld; now there is a hole over seventy acres in extent and forty to sixty feet deep surrounded by machinery and a high barbed-wire fence. The statistics given to us showed that already more than a million carats of diamonds have been taken out and that test borings down to a thousand feet exhibited ground similar to that near the surface. An invitation from the management to lunch and to an inspection of the mine was accepted by at least a hundred and fifty members. It was amusing to be with and to watch the party, guided by Mr. Cullinan, the original discoverer, and his staff, wandering through the diggings and examining the ground, evidently in the hope of discovering another Cullinan diamond; and later crowding round the tables on which the concentrates were spread for examination—the stage where mechanical treatment ends and hand labor begins—and picking out a few small stones. This final process is shortly to be replaced by a mechanical one based

on the fact that the diamond seems to be the only stone which will stick to a bed of grease when a pan of 'concentrates' (the remainder after all the earth and lighter material have been washed out) is passed over it with a properly adjusted flow of water.

A cross country trek from Pretoria to Mafeking seemed to offer greater attractions than the 882 miles of rail which separate those places, in spite of the fact that Bloemfontein and Kimberley would thus be omitted. At present there are no rail connections between the two trunk lines going north from De Aar Junction (which lies just south of the Orange River), although Klerksdorp, the terminus of a branch line from Johannesburg, and Mafeking, on the Cape-Bul-

SPOT (in the bank near the telegraph post) WHERE THE FAMOUS CULLINAN DIAMOND WAS FOUND.

awayo railroad, are only 93 miles apart. These connecting links are of course valuable for opening up the country through which they pass, but it is difficult to get a return on the capital laid out where the chief traffic is to and from the coast and not an exchange between inland centers. But it is hoped that the time is not far distant when the farms in this district may furnish regular supplies to the large towns and make them independent of imported food produce. Railways are already projected from Pretoria to Rustenburg, sixty miles to the west; and also from Klerksdorp to Fourteenstreams which lies on the Cape-Bulawayo railway, 140 miles to the southeast, thus making the first connection between the two trunk lines north of their branching point.

VI.

The route chosen for the journey to Mafeking by road lay through 180 miles of some of the most fertile districts of the Transvaal and included nights spent at the small towns of Rustenburg, Zeerust and Ottoshoop. Two stage coaches, each capable of carrying eighteen passengers with baggage, and a large ambulance wagon were provided for the accommodation of the party which, with guides and leaders, numbered thirty. These coaches have of course been gradually supplanted by railroads where there was sufficient traffic to justify a regular service, but they are still in use in Rhodesia. As the illustration

AN IRRIGATION DAM AND TRENCH ON MR. GINSBERG'S FARM. (Photo lent by Mr C. G. Darwin.)

shows, they are of the Concord type and indeed those which actually conveyed us were built in the United States. Six pairs of mules were harnessed to each coach. We were accompanied throughout by Messrs. H. H. Hewson, W. D. Sievwright and G. W. Herdman of Pretoria, and it was mainly owing to their care and thoughtfulness for our welfare that no serious mishap occurred during the six days' trek. The magistrate of each urban district through which we passed also joined the party, while it traveled through his territory, and much was learnt of the land and its people from these gentlemen and from residents whom we met along the route from time to time. The limits set to this article forbid more than a brief account of the general impressions gained. It must suffice to mention that the first night we camped

CROSSING A DRIFT.

luxuriously on Mr. S. Ginsberg's farm as his guests, the camp having been provided by the Royal Engineers, and the next morning wandered over the farm inspecting the experimental growing of tobacco and oranges and an irrigation trench, some two and a half miles long, carried round the side of a hill. Another night we slept on the open veld wrapped in blankets and rugs. Our experience of the hotels at the three towns mentioned above was a favorable one; they have nothing to lose by a comparison with those in places of a similar size in either Europe or America.

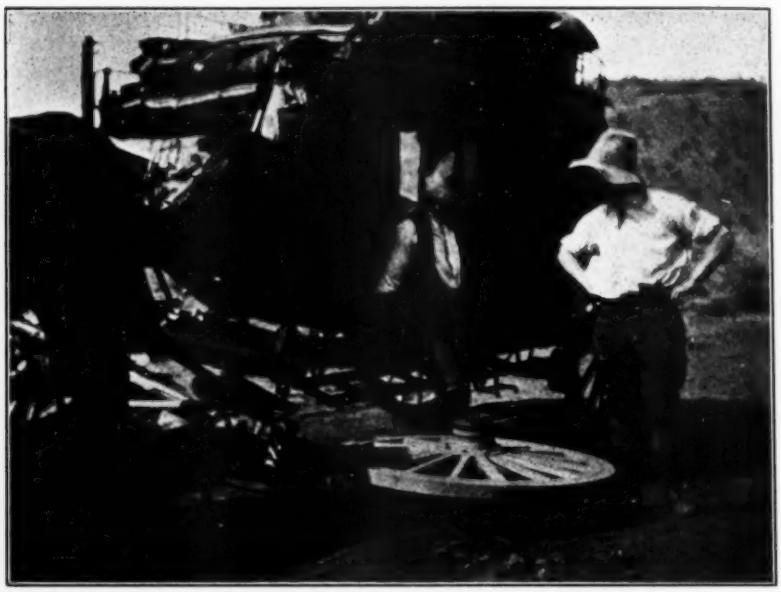
The government is carrying on the work of improving the main roads in farming districts by building bridges over the deeper 'drifts' (fords where the rivers can be crossed), by metalling the surfaces, and by digging side trenches to carry off the torrential rains during the wet season. This is in line with the policy of developing the agricultural possibilities of the Transvaal through an increase in the facilities for getting the produce to a market. But the difficulties of raising it are many. The cattle have been nearly exterminated by war and disease; to prevent the spread of the latter in future the farms are being accurately surveyed and surrounded by barbed-wire fences. The raising of crops with any regularity seems to require expensive schemes of irrigation and the construction of dams to store the water, but it is by no means certain that these schemes can be made to pay their cost. Tobacco growing has long been fairly successful in some parts and the leaf finds a ready sale. Some fruits, especially oranges, can be also

grown with success where the farmer has sufficient capital to await the time necessary to get a crop, but the cost of transportation prevents export in competition with the fruits produced in other parts of the world. It is well known that a great effort has been made by the government to get the Boers back on their farms, and we saw one example of this in the new houses which have been built near the roofless walls of every old one that we passed. For the Dutch settler is in general the only class which has so far succeeded in extracting a living out of the land, partly owing to his few needs and his content with meager surroundings, but he is in some ways an obstacle to development by his constitutional dislike to any alteration of the methods handed down to him from his ancestors.

On every side were to be seen evidences of the long-continued guerilla warfare; block houses perched on the hills, sometimes in long rows a mile or two apart, at other times in isolated places; an occasional area covered with rusty tin cans showing where a concentration camp had been situated; skeletons of cattle and mules along the roadside; an acre of the whitened bones of oxen, the scene of the destruction of a convoy caught in a trap. Many of the pleasures and troubles of trekking were experienced. The night under the open sky on the veld, various breakdowns and minor accidents, the hot noon suns and cold starlit skies, the clouds of red dust raised by the mules—all combined to give some idea of that fascination for traveling in Africa which has so often been the theme in stories of fact and fiction.

TREE IN RUSTENBURG UNDER WHICH THE LATE MR. KRUGER PREACHED HIS FIRST SERMON TO THE BURGHERS.

Mafeking has little of interest for the ordinary sightseer and nothing remains of its spectacular siege except a few banks on the flat plain showing where the trenches had been placed. The native 'staadt' contains some five thousand blacks living in huts and houses of sun-baked bricks and plaster, with occasional corrugated iron roofs. The special train only stopped here long enough to gather up those who had come by road from the Transvaal. All the following day was spent in running along over the brown veld, sometimes flat and bare, sometimes covered with thick bush, but generally rolling country dotted with trees and intersected here and there with the dry beds of



AN INCIDENT OF OUR 'TREK.'

streams. At this season of the year the ground has become parched under the hot sun and long coarse dry grass covers the whole face of the country. A tree with a straight trunk is rarely visible and the twisted branches were devoid of foliage except where parasitic growths, frequently species of misletoe, showed their bright green stems. All the way from Durban to the end of our ride, grass fires, started by the farmers to clear off the ground before the rains, were visible and often made the nights picturesque as they slowly burned their way in long lines over the plains and hills.

The standard South African railway gauge is forty-two inches, fourteen and a half inches less than the ordinary one. This is probably an economical width for the present needs of the country, but it introduces difficulties in the construction of comfortable sleeping ac-

commodation. The present type of car used on the Cape government railways has a very narrow side corridor from which open compartments, each containing four berths, two upper and two lower, transverse to the length of the car. These berths are rather short for one a little over the average stature, and the lavatory accommodation is somewhat limited. But the dining cars provide excellent meals at two dollars a day and this in a country into which much of the food is at present imported must be considered very moderate, especially north of De Aar Junction. The new cars on the Natal railways are, however, of a much more roomy and convenient type. It was in special trains made up from these cars that the majority of the members of the association was to spend most of the two weeks following the departure from Johannesburg. The life on board was not uncomfortable, and there was plenty to interest in the views which successively passed before us as we steamed along at fifteen to thirty miles an hour, or in discussions on what we had seen and heard. Then at every stopping place, and these were not infrequent for taking water or coal, the zoologists swarmed from the train with nets and snared every insect within a radius of two hundred yards, and the geologists with their hammers gathered in treasured specimens of rocks. The engineer became skilful in solving the problem of gathering up the passengers and not wasting time in waiting for the laggards, by steaming so slowly out of the way side stations that any one not more than a hundred yards from the train when it started could easily get on board.

VII.

Bulawayo, the principal town in Rhodesia, exhibits strongly the large ideas of Cecil Rhodes and his confidence in the future. Laid out in blocks, with streets far wider than one finds even in the most modern towns, its principal buildings in the center near an immense market square, Bulawayo is prepared for development to an extent which seems to be out of proportion to its needs for many years to come. At the present time there are many inconveniences in having the town so widely spread out, and the expense of running it is not small. Except in the center, one can drive along roads with name posts at every corner, but not to be traced otherwise than by wheel tracks in the yellow dusty ground. Rhodes's house, presented by him to the government, is situated on a hill three miles from the town and is connected with it by a perfectly straight and broad road planted with a double avenue of trees. A better method could hardly have been devised for enhancing the dignity of the approach to his residence or for striking a note in his character—the direct route to his objective and a well-marked way for those who should follow in his footsteps.

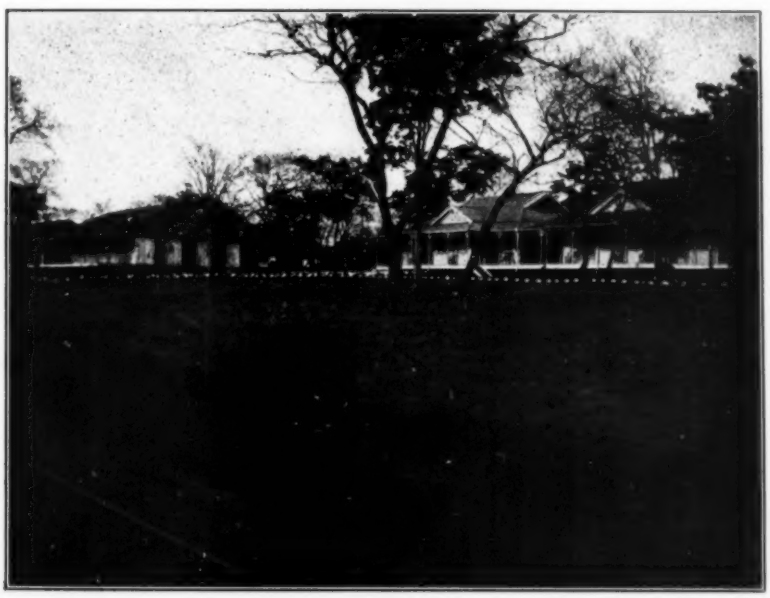
THE PRINCIPAL STREET IN BULAWAYO.

The poetic side of his nature is shown in his choice of a final resting place. From a point twenty miles along the railway south of Bulawayo a branch line runs towards the Matopo hills where he had a large estate. A drive of eight miles from the hotel at the terminus leads into wild scenery along gradually ascending valleys, past large enclosures containing wild animals and through a park which is being continually improved by the planting of trees and all kinds of flora. On either side the road is flanked by hills which seem to have been built up by Titans who piled up rocks and boulders in every conceivable position, perching them on the tops and sides of smooth turtle-back shaped rocks five hundred feet high, or dropping them on the plain and covering them with bushes and trees. As the 'Roof of the World' is approached, the carriages are left and a footpath ascends gradually over smooth rock on to the flat top of one of the highest of the hills—the 'World's View.' On this spot, enclosed by a circle of boulders some fifteen or twenty feet high, is placed the grave dug out of solid rock and covered by a plain slab bearing only the simple inscription, 'Here lie the remains of Cecil Rhodes.' A not unpleasing contrast is afforded by an elaborate monument nearby erected to the memory of Major Wilson and his comrades who fell at the Shangani River on December 4, 1894.

This large estate was owned by Cecil Rhodes and was left by him under the care of the trustees for the benefit of the public, full direc-

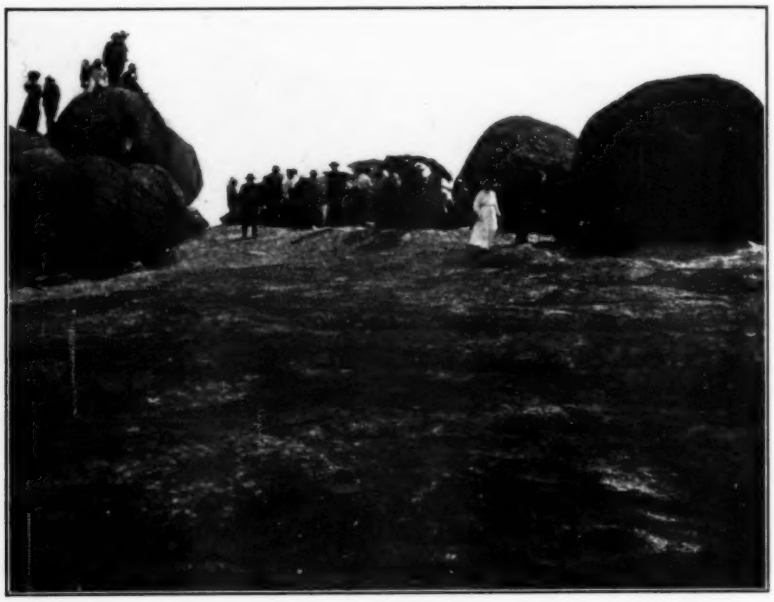
tions being given in his will for improving the property with the help of funds which he designated for the purpose. One can not travel through Rhodesia or indeed through any part of South Africa without feeling how strongly the ideas of this one man have dominated and still largely determine the development of the country. Whatever we may think of his career, we are forced to admit that the reverence felt for him and his opinions by those who worked with or under him mark him out as a personality of unusual force. He inspired too an enduring belief in the future of Rhodesia, and this in the face of almost every difficulty that a new country has to undergo. Against the condemnation of some of his actions at the bar of public opinion is to be set the opinion of those who knew him and who believe that he acted consistently with a high standard of his own and that at his early death the British Empire, and perhaps the world, lost one who might have achieved a foremost place in the history of nations.

The Victoria Falls on the Zambesi river lie 282 miles to the northwest of Bulawayo. The curious box-like formation into which the water drops with the lip over a mile long and the opposite ground on the same level and not more than 150 yards away, gives unusually fine points of view and permits every part of the falls to be seen. When the water is low, as was the case at the time of our visit, one can see down to the bottom of the chasm 400 feet below; or cross over to the islands above and look down into the depths from the uncovered rocks with the water tumbling down close by. The river leaves the 'box' by



HOTEL AT THE VICTORIA FALLS.

a narrow opening some distance from the middle of the long opposite edge, and pursues its way through a deep gorge which winds to and fro like the strokes of the letter W several times repeated, showing clearly the successive stages by which the river bed has burrowed its way through the country. The 'rain-forest,' a thick mass of trees and undergrowth, and the Palm Kloof, a ravine leading down to the bottom of the gorge, are kept moist by the shifting masses of spray. Above the falls, the banks are clothed with tropical vegetation and the long reaches of apparently calm but swiftly flowing water show little of the many hidden dangers which small craft passing along them must avoid. The marvels of nature are perhaps equalled by those of civilization.

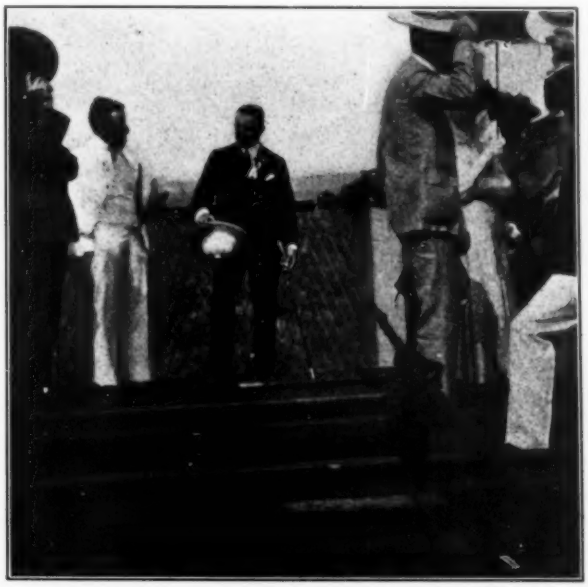


THE 'WORLD'S VIEW.'

Ten years ago not more than thirty white men are known to have visited this spot since its discovery in 1855 by Livingstone, and last year it was connected with Bulawayo by rail. The line has now been carried over the gorge just below the falls by a bridge 650 feet long and 350 feet above the water, finished last spring; it is being continued now to Lake Tanganyika, and had in September reached a point 160 miles from the Falls towards this objective. Perhaps the greatest marvel of all, as Professor Darwin remarked in opening the bridge to passenger traffic on the morning of September 12, was that his speech on that occasion should appear in full in the London afternoon papers of the same day.

Tourists will now find no difficulty in reaching the Falls nor will

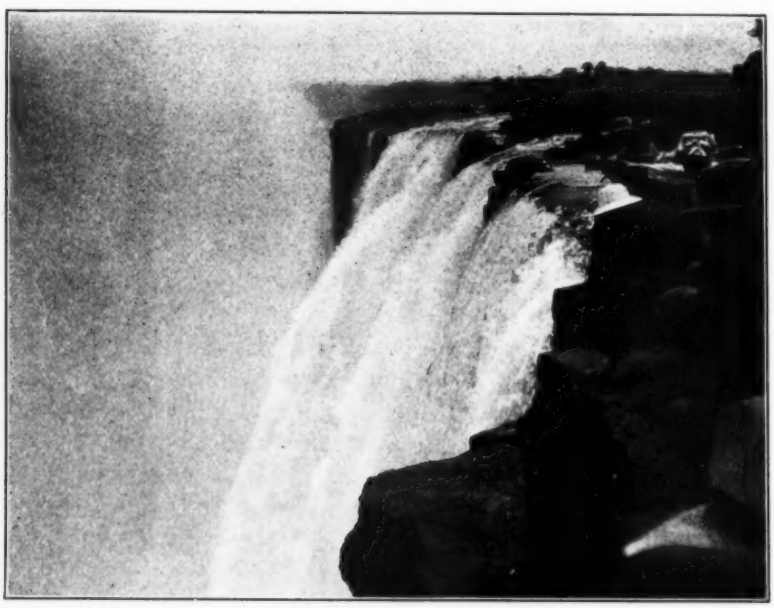
they need to expect discomfort while staying there. The hotel, about a mile from the principal points of view, supplies food and lodging on much the same scale as those in other parts of Rhodesia. Perhaps the greatest satisfaction on arrival is the absence of any feeling of disappointment, however much one may have heard or read of the beauty and magnitude of the falls, and civilization has so far done nothing to spoil the views. Mr. F. W. Sykes, who has been appointed conservator by the Chartered Company, has constructed paths so that visitors may approach every point of view and enjoy the scenery without the encumbrance of a hired guide. The new bridge rather adds to the effect than otherwise: as one descends to the bottom of the gorge amidst the



THE PRESIDENT OPENING THE BRIDGE.

trees and undergrowth in the Palm Kloof, its graceful arch gives the eye a resting place near the top and assists one to appreciate the height of the rugged vertical cliffs. I understood that the power house is to be constructed at the foot of the second bend of the gorge, the water being conveyed from above the falls by a tunnel or canal, so that nothing of it will be visible from the usual points of view. It is intended that no new buildings shall be placed on the general level of the land within a radius of a few miles and plans are even in existence for moving the present hotel further away. As to the available energy for commercial purposes, the latest estimates give a minimum of 300,000 horse-power at low water as against 5,000,000 at Niagara; but after the rains there would be many times this amount so that even if the minimum

RAINBOW SEEN LOOKING ALONG THE FALLS FROM NEAR THE WEST END.



PART OF THE 'MAIN FALL' FROM LIVINGSTONE ISLAND.

should be wholly employed, the spectacle at full flood would not be very seriously affected. The opinions of the residents as to the best time for a visit are divided. Some preferred August and September when the water is low and the air comparatively clear of mist; others recommended January and February for seeing the huge masses of water which then cover nearly the whole width of the lip but which can only be seen in glimpses as the spray shifts about.

VIII.

On the return to Bulawayo, the east and west coast parties separated, the latter going direct to Cape Town and thence home. The rail journey to Beira on the east coast was broken at Salisbury and Umtali. Both of these towns are situated in or near gold-bearing districts. The region is interesting too to ethnologists on account of the ancient ruins to be found at Zimbabwe and elsewhere, but it was sad to learn that all the later evidence so far obtained has destroyed any connection between Rhodesia and the land of Ophir. The party, now reduced to two hundred, was entertained at Salisbury and Umtali by the residents to lunch; and similar hospitality was shown by the governor, the Portuguese officials and the Mozambique Company at Beira. Our debt of gratitude to these three towns is the greater for the trouble and expense to which the small number of residents had put themselves, although our stay in each had to be limited to only a few hours; there was no chance to make even the small return in our power by giving lectures or by learning, except in conversation, of the development of the districts round these recent settlements.

A few concluding words on Rhodesia must suffice. The details of its administration and development by the British South Africa Chartered Company are to be found in the published reports and circulars of the company. As to its possibilities, I can only give here, with all reserve, my own opinion formed on what I saw in the rapid journey or learnt in several conversations with various officials and others. In its general characteristics, the country does not appear to differ greatly from the Transvaal. But it seems to have rather better advantages. Its soil is perhaps more fertile, its rains more certain and droughts less frequent. The mineral wealth is considerable; there are excellent coal seams, a rich copper mine and, if the present prospects are fulfilled, valuable gold fields. A magnificent river flows through the country, adapted at the Falls to furnish power for all purposes in the driest season and possibly available in the future for irrigation if necessary. An unbounded enthusiasm and belief in its future amongst those who are administering its affairs there are not amongst the smallest of the assets of Rhodesia.

The 'Durham Castle' left Beira on September 17. A brief call of

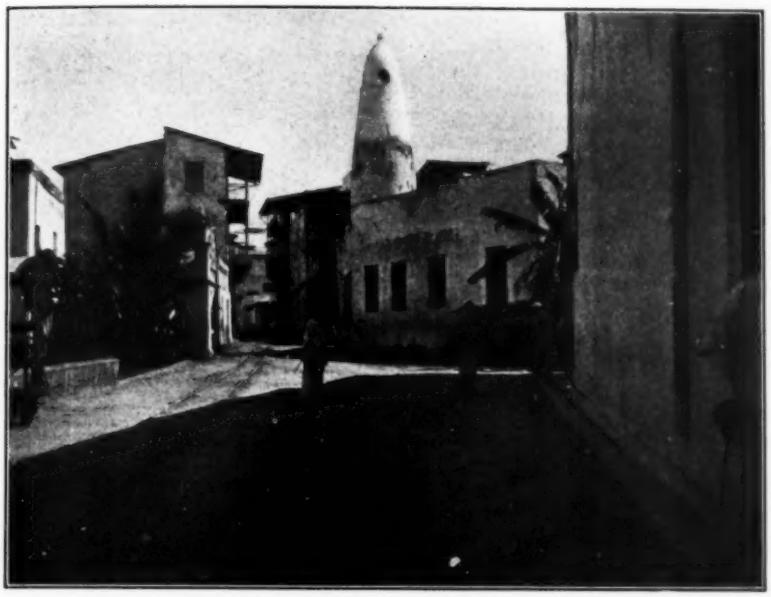
a few hours was made at the low island built of coral on which Mozambique stands. The town is picturesque with its square topped houses and walls washed a bright red, yellow and light blue, the native huts of bamboo thatched with palm leaves, and the numerous palm trees growing everywhere. A stay of a day and a half allowed us to see Mombasa, to make purchases in its native bazaars, and to take a journey by train to Mazeros, fourteen miles up into the country. The town is close to the equator and we saw luxuriant tropical vegetation, cocoanut and other species of palms, and the huge squat trunks of the baobab—a pleasing contrast after our long experience of the dried-up veld. Leaving there, eleven days of burning sun and hot stifling nights in the Indian Ocean, across the gulf of Aden and up the Red Sea whose waters one day showed a temperature of 92° Fahrenheit, brought us to Suez. After a week in Egypt necessitated by the block in the Canal, the ship left Port Said for Marseilles where many landed in order to reach England rapidly. The remnant, passing through the Straits of Gibraltar and crossing the Bay of Biscay, disembarked at Southampton on October 24.

The one sad incident which occurred during the tour was the illness and death of Sir William Wharton, at Cape Town, after our departure from Beira. His work and scientific attainments will find a more fitting record elsewhere. Those who had learned to know him as a fellow-traveler can readily understand and sympathize with the sense of loss experienced by his family and many friends. As I revise these lines comes the news of the death in Cambridge of another member of the party which will not be less severely felt, Sir Richard Jebb, perhaps the most distinguished scholar of his day and a leading authority on educational questions. One rarely talked with him without drawing something interesting from his great store of knowledge and he added much to the success of the meeting and the pleasure of the voyages by his presence amongst us.

IX.

It is almost impossible to sum up in a few sentences the wealth of impressions received during the five weeks in South Africa and the subsequent brief visits in East and North Africa. A 'gigantic picnic,' as Professor Darwin characterized the tour in one of his speeches, it truly was; but it was also a 'scientific picnic' with wonderful opportunities for profit to those who wished to take advantage of them. The various handbooks, specially prepared for us, on matters connected with the colonies, the arrangements made for seeing everything without waste of time and with the minimum of trouble, the way in which all the people put themselves at our disposal whether for showing the country or for telling what they knew—all helped to make the experi-

ence no ordinary one and enabled us to carry away facts and ideas which could hardly have been obtained in a much longer period. To those who are accustomed to travel in Europe and who have money and leisure for four months or more away from home, a visit to South Africa is to be highly recommended. The steamers, while not equipped with the excessive luxuries of the most modern North Atlantic boats, are comfortable and sail over waters which are rarely disturbed by storms or gales. The long distance trains are at least as good as those in Europe, and hotels, accustomed to cater for English people, will be found everywhere. The cost of such an expedition extended



A Street in Mombasa.

over four months need not exceed fifteen hundred dollars per head, including passage money.

Finally, what should South Africa hope to receive in return from those who have accepted her hospitality? An increased sympathy with her people, a better knowledge of their struggles in developing the resources of the country, and an attempt to put an end to the long career of misrepresentation which has been pursued by many public bodies and private individuals in the mother country, doubtless. But there is more. The colonies are not lands where the agriculturist can simply sow his seed and watch his crops grow; where the rancher can stock his farm and await the increase; where the planter puts in his trees and leaves them until the harvest is ripe; where the miner has only to dig out the gold and grow rich quickly; or where the trader can take his goods and calculate his profits beforehand. Irrigation,

and, in many cases, fertilization of the soil, are generally necessary for obtaining a moderate crop; cattle must be protected from the parasites and diseases which carry them off wholesale; the planters must make many experiments to find suitable trees and then discover a market for his fruits; gold digging can only be made to pay by companies with large financial resources employing the most modern scientific methods for the extraction of the metal; and the trader is handicapped by the cost of transportation and the small demand for his goods. These are some of the problems which the colonist asks his visitors with their store of knowledge to help him to solve: he needs every device which science can furnish to enable him to exist. Further, his land has been

INSIDE THE MOHAMMEDAN UNIVERSITY IN CAIRO. (Photo lent by Mr. C. G. Darwin.)

lately rent by civil war, and two white races with totally different ideals must live side by side working together for the common good: the black races, far outnumbering the settlers, present problems at least as difficult as those we have to deal with in the United States. He asks too for help in building up schemes of education for both black and white, and these schemes must include primary and secondary schools, colleges and universities for the study of the humanities and pure science, and, what is perhaps more important than all for the prosperity of the colonies at the present moment, institutions where elementary and advanced technical education in all its branches can be obtained. If any help is forthcoming towards the solution of these questions, South Africa will feel well repaid for her hospitality and will consider that the visit of the British Association to her shores has not been in vain.

SOME RECENT TENDENCIES IN MATHEMATICAL INSTRUCTION

By Professor G. A. MILLER
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SEVERAL prominent writers have suggested that 'pure mathematics' should be called 'free mathematics' in view of the great latitude of freedom both in subject matter and in methods of work.[1] This view is diametrically opposed to the one commonly held. The student of elementary text-books on mathematics can not fail to be impressed by the close similarity in subject matter and in methods. In our arithmetics and algebras we find problems which are quite similar to those in the work written by Ahmes, an Egyptian priest living seventeen hundred years before Christ. Our geometries bear such a close resemblance to Euclid's, written three hundred years before Christ, that the terms Euclid and elementary geometry are still practically synonymous in the minds of many teachers.

Moreover, there are numerous *a priori* reasons to regard mathematics as a slave rather than as a free, living, pulsating being, exhibiting the many exhilarating changes characteristic of youthful development. The reasonableness of the main postulates of mathematics has never been questioned. In most cases contrary hypotheses would appear perfectly absurd to those who have not been trained to mistrust their intuitions. The main function of mathematics has been, and probably always will be, to draw necessary conclusions from such postulates. Whether the postulates have been explicitly stated or not is a secondary matter. Hence mathematics has become a vast structure which is perfectly invulnerable except possibly at its foundation, and here the attack seems merely a matter of words. The most that has been done in an effectual manner is to erect structures on other sets of postulates. It should be emphasized that the main duty of the mathematician is to build upon given postulates. In these operations he will always be free from attack, since he can not arrive at any conclusion without proving that it is the only possible one.[2]

[1] Cf. Liebmann, *Jahresbericht der Deutschen Mathematiker-Vereinigung*, Vol. 14 (1905), p. 231.

[2] No attempt is here made to define the term mathematics. The views expressed are equally true whether mathematics is defined as a method, or whether the objects which it considers should enter into the definition. From

As mathematics enters into questions which are common to all society, from the most primitive to the most civilized, it is clear that some of its elements must always enter into the education of every one. Within these narrow limits there is little freedom of choice. In rising from this low view of mathematics to the one which recognizes its value in developing thought power and thought caution, one soon arrives in regions of the greatest freedom. From such a standpoint one can readily comprehend why so profound a thinker as Simon Newcomb should say, 'The mathematics of the twenty-first century may be very different from our own: perhaps the schoolboy will begin algebra with the theory of substitution-groups as he might now but for inherited habits.'[2]

During the last few decades Germany has wielded a predominating influence on the development of mathematics in this country. Hence it is natural that the tendencies of German mathematical development should be strongly felt in this country. Two of these tendencies are especially prominent: viz., the uniting of pure and applied mathematics, and the encyclopedic character of pure mathematics. Definite evidence of the former tendency is furnished by the rapid increase in the number of courses on the mathematics of insurance, mathmatics for students of physics and chemistry, and especially by the enactment of 1898 which made applied mathematics a distinct requirement of those who expected to become teachers of mathematics. While the American universities have been more conservative in these directions, yet there are many evidences that these tendencies are strongly reflected in the mathematical courses offered by our higher institutions.

Jacobi was perhaps the first eminent German mathematician who made special efforts to lead his students to the boundary between the known and unknown as rapidly as possible, and then to make them coworkers with him in investigating new problems. His methods were imitated very largely by others so that German mathematical instruction became, to an unusually large extent, instruction in research, or, at least, instruction in regions which had been very inadequately explored. These methods have been employed in other countries. In our own country their introduction was hastened by the teaching of Sylvester and Cayley, who employed similar methods while they were connected with Johns Hopkins University.

While the discovery of new truths gives an interest and charm

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the former standpoint, geometry, as commonly understood, is not mathematics. For a splendid exposition of the definitions of mathematics we refer to Bôcher, 'The Fundamental Conceptions and Methods of Mathematics,' *Bulletin of the American Mathematical Society*, Vol. 11 (1905), p. 115.

[2] Newcomb, *Bulletin of the American Mathematical Society*, Vol. 3 (1894), p. 107.

which can scarcely be attained in any other way, yet the early attack on research problems has not been free from undesirable results. If the mind is centered on one line of thought it is less apt to be in condition to receive deep impressions of other fields which may be equally important. Only the greatest minds have been able to attain to those broad and impressive views which comprehend the true correlation of the different lines of mathematical activity, in addition to making important contributions along any one line. In recent years there has been a tendency to encourage breadth of scholarship even at the expense of research in early years,—a tendency which Klein has aptly named encyclopedic.[4]

In American mathematical research activity was very limited until recent years. Within the last decade the mathematical productivity has more than doubled, both as to quality and as to quantity. This has been largely due to foreign training, as only very few of our larger institutions have a sufficient number of research men on their faculties to afford their students opportunities to enter upon fields of research which are best suited to their tastes and ability. Hence the encyclopedic tendency of German mathematics, and possibly also of that of France, should not affect us for a number of years.

The tendencies which have been mentioned relate principally to university instruction. During the last few years there has been an unprecedented activity along lines which relate principally to secondary schools. This movement is sometimes called the Perry movement, in view of the great activity of Professor John Perry, of the Royal College of Science, London. Perry's paper at the recent Glasgow meeting of the British Association for the Advancement of Science provoked a great deal of discussion, and was followed by the appointment of a committee with Professor Forsyth, of Cambridge, as chairman, 'to report upon improvements that might be effected in the teaching of mathematics, in the first instance in the teaching of elementary mathematics, and upon such means as they think likely to effect such improvements.'

In our own country the movement has been brought into prominence largely through the efforts of Professor Moore, who devoted a part of his presidential address before the American Mathematical Society to questions related to this movement. That the time was ripe for such a movement seems evidenced by the numerous organizations of teachers of mathematics with a view to the discussion of questions related to the improvements in teaching and in the selection of subject matter.[5]

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[4] Klein, *Jahresbericht der Deutschen Mathematiker-Vereinigung*, Vol. 13 (1904), p. 473.

[5] The following associations have been organized within a few years:

As might be expected these agitations have led to the most severe attacks on the present state of mathematical instruction. Professor Perry seems to have especial gifts along this line, as may be inferred from the following quotation:[6] "I would rather be utterly ignorant of all the wonderful literature and science of the last twenty-four centuries, even of the wonderful achievements of the last fifty years, than not to have the sense that our whole system of so-called education is as degrading to literature and philosophy as it is to English boys and men." This is the view of a man who, as chairman of the Board of Examiners of the Board of Education of London in engineering, applied mechanics and practical mathematics, has charge of about a hundred thousand apprentices in English night schools.

One of the main contentions of the agitators is that our mathematical instruction should be more concrete and inductive. This is frequently expressed by the term 'the laboratory method of teaching mathematics' and several of our leading universities have announced courses to be taught by this method. This gives evidence of a profound movement in methods of mathematical instruction, which will doubtless effect many reforms even if it can not be expected that the extreme views will find general adoption.

The teaching of elementary geometry has perhaps been most severely attacked. This attack has been supported, if not directed, by some of the very foremost mathematicians. Klein has recently said that the methods adopted in Euclid's geometry are unsuited for boys.[7] It has become the fashion of text-book writers to call especial attention to the rigor of their presentation. Fortunately these claims are generally unsubstantiated. There are few things that would give more definite proof of the perfect unsuitableness of an elementary text-book than the fact that every step in the presentation was rigorous. The history of mathematics shows that periods of discovery are followed rather than preceded by examination into the rigor of methods, and the same general principle holds in reference to the training of students.

In France C. Méray has perhaps done the most effective work towards reform in elementary instruction in geometry. At the last meeting of the French Association the section of mathematical sciences passed a resolution to request the association to address the minister

Central Association of Science and Mathematics Teachers, Association of Teachers of Mathematics in the Middle States and Maryland, Association of Ohio Teachers of Mathematics and Science, Mathematical Section of the California Teachers' Association, Missouri Society of Teachers of Mathematics, Mathematical Association of Washington, Association of Mathematical Teachers in New England, Kansas Association of Mathematics Teachers.

[6] *Nature*, Vol. 65 (1902), p. 484.

[7] *Jahresbericht der Deutschen Mathematiker-Vereinigung*, Vol. 14 (1904), p. 41.

of public instruction with a view to encouraging the introduction of 'Méray's method' in the teaching of geometry. During last year this method was employed in at least thirty of the French schools, and very enthusiastic reports of improvement were received. The method is expounded in 'Nouveaux Eléments de Géometrie par Méray,' as well as in several of the French journals. One of its important features is the introduction of the notions of displacements and the group of displacements into elementry geometry.

While reform movements in mathematical instruction are not new, yet the present movement is without a parallel both with respect to its extent and with respect to its vigor. The question naturally arises whether the mental inclinations of civilized races are undergoing gradual changes so that concepts which at one time give pleasure and power to the youthful mind, at other times are beyond the capacity of the average mind, or whether we are becoming more sympathetic with the difficulties which have to be overcome in mental development and take greater precautions to make the steps natural. Whatever may be the cause, it seems probable that readjustment will be effected without departing very far from the older methods. The most likely changes in elementary instruction are those which Klein has been so actively advocating; viz., the early introduction and frequent use of the concept of a function and the teaching of the elements of analytic geometry and the differential and integral calculus at a much earlier period, before the student begins to specialize.

THE WEALTH OF THE COMMONWEALTH

By Dr. A. C. LANE
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IN these days of evolutionary theories and dominance of biology it has become fashionable to apply the analogies and language of biology in other fields—for the geographer to speak of mature rivers, and youthful drainage, and the sociologist and historian to speak of society and nations as organisms. So, without going so far as to assume that there are units of consciousness apart from brains, and that there is an American or Michigan consciousness standing in somewhat the same relation to your consciousness and my consciousness as ours may be supposed to stand in relation to the sensitiveness which may belong to each individual cell of the body, we may still accept the comparison of the nation or state to that of an organism so far as it may help to remember and connect real facts.

The youth of a people is in reality like that of a man, full of hope, extravagant, feeling boundless resources and inclined recklessly to squander them in attaining the objects of desire. If it is wisely guided, age may bring riches which are not merely in prospect, but in possession, which are the fruits of useful industry and the relics and mementoes of a noble ancestry. Unwisely guided, age may bring the exhaustion of the resources thought to be boundless, with nothing worth while to show for them; and as the individual man may be found bankrupt in purse and pride, so the nation or community may suddenly find its supposedly inexhaustible supplies exhausted, the fabulous fertility of its fields failing, its hills once clad in forests naked and seamed and gashed by gullies until they remind one of the beggar's clothes whose spendthrift habits have dragged him down to like depths of destitution.

Mill* says that 'looking on the world as not only the home of man, but as subservient in all its phenomena to the welfare of the human race, we may consider the development of any region to mean such treatment of its natural resources as will enable the land to continue to support an increasing number of inhabitants,' and ventures the suggestion that, "fortune hunting is inimical to development in its true sense. A fortune acquired through production or speculation can usually be made by only a few individuals and almost always entails the exhaustion of natural resources or the lowering of wages; a pros-

* Hugh R. Mill, 'New Lands,' p. 7.

perous livelihood, on the other hand, can often be secured to a multitude without permanent impoverishment of the land."

The former statement we may consider a very fair definition of development of a country. The latter is one of those general statements which are hard to disprove, being both vague and qualified. But it suggests that there may be such a thing as improper development. Much talk and writing seem based on the theory that development is always and only good—is a good in itself. This we may fairly question.

It is fit then to consider what is the path of wisdom, what is that true development of natural resources which scattereth and yet increaseth, and what is that development which may better be called devastation, whose scattering is not that of the seed corn which returns many fold, but that of the whirlwind and tornado. How best to conserve natural resources and secure adequate compensation for that consumption which is necessary are questions which interest scientists studying either the face of nature or the course of history, patriots desiring the welfare of their country, and parents desiring to pass on unimpaired the patrimony that has come down to them.

In the first place, note that the development of national resources does not in all cases imply consumption. It is true that one can not eat one's cake and have it too, but it is also true that one can use a house, see a picture, and gaze at a statue, and they be none the worse for it. Italy and Greece are vastly wealthier to-day than they would have been had the marbles of their statues remained in the quarries of Pentelicos, Paros or Carrara.

The marble still in the quarry has not the value that it has piled up in the Parthenon, and every Milton who dies mute, inglorious, but who might have sung immortal verse is a loss and waste, most of course to the higher and spiritual interests of the nation, but also to the commercial interests as well. I do not know how much cash loss of trade it would be to Stratford-on-Avon had Shakespeare lived and died there without knowing letters, but I do know that the American pilgrims to Europe are expected to leave 130,000,000 dollars, and a very large part of this comes from those who go to visit the footsteps of great men gone before us.

Thus a development of natural resources which means merely turning the material into more valuable, artistic shape, or surrounding it with inspiring associations—such a development is pure gain and no loss, so long at least as we do not bury living prophets under the tombs of their forerunners or shackle the present with reverence for the past. This accumulation of wealth may be either by the importation of art from abroad or by turning our own material into art forms. Particularly is this true of architecture and of furniture which are worthy to descend as heirlooms from father to son. Dollar chairs are no

permanent gain to the assets of the state, Chippendale sofas are. The accumulation within the state of art treasures, that is to say of fine work in fitting material is, therefore, a means of increasing the wealth of the state. And schools and professional feeling which shall help the workman to become the artisan, to put individuality into his work and feel a pride in it, and money spent in the production and education of men who serve mankind and whose footsteps will be gazed upon with reverence by coming generations are directly helping the prosperity of the commonwealth. In so far then as work of artistic value is expended upon material which is retained in the state, there is a definite increase in the wealth of the state.

As a second class we have the resources of which there is a continuous and transitory supply, in contrast to those of which there is a stock, in the using of which we are drawing on an original supply or the accumulation of generations. The farmer's windmill in using wind power is using a resource of the former class, while the use of coal is drawing on a reserve.

Farm products so far as they are due to air, water, sunshine and hard work, the minting of golden sunshine into golden grain, are a development of resources continuously supplied, but there is also a little ash or mineral matter which, if not replaced by manure or fertilizer, is a draft upon the capital of the commonwealth.

Most important perhaps of these resources is water power, which is indeed largely used, but of which there are millions of horse power yet unused. Any permanent substantial dams which may help us to utilize this will be a permanent gain to the resources of the state.

Third, are the resources which are wasting away in the use. As we gaze on a piece of soft coal across the cleavage, we shall see dozens of alternating bright and dull bands in an inch. Each of these may represent an annual or semi-annual change of climate, and a ton of coal may represent thirty tons of wood. Thus in using coal we are dissipating in a few years the accumulations of generations heaped up millions of years ago.

Now of these reserve accumulations, and I can not emphasize the fact too strongly, there is never an inexhaustible supply. People a scant half century ago used to talk of the inexhaustible supplies of pine in the Saginaw. There is now hardly a stick standing. Men prate of inexhaustible mines. There are no inexhaustible mines. The bottom of perhaps the greatest mine in the world, the Calumet and Hecla, on its conglomerate is much too visible. The Spindletop bubble has already burst, and its wealth has practically vanished, wasting what should have been the industry of a generation in a scant decade. The towns that had natural gas no longer burn it in flambeaux that burn millions of cubic feet a day, but charge twenty cents a thousand for it. Of course sometimes the supplies are in a way practically inexhaustible.

The salt of Michigan, if the present rate of production of two billion pounds a year is not too greatly exceeded, might probably last some two million years. Yet the consumption will increase—we know not how much, and a much less time and amount would threaten the collapse of Detroit beneath Lake Erie.

They talked only a few decades ago of inexhaustible supplies of iron ore, and yet now a pretty well posted man says there is in sight but thirty or forty years' supply of ore—that is now merchantable, I presume he means. I would double that and say that, at the present rate of consumption of some 23,000,000 tons a year, there is probably enough for eighty years' consumption. Still that is not a very long time in the lifetime of a nation.

One thing must be noted in regard to this matter of exhaustion. It is rare that a resource supposed to be inexhaustible comes so sharply and entirely to an end as the pine of the Saginaw Valley (the *American Lumberman* says that pine is on the toboggan), or the countless herds of buffalo of the western plains, which were sharply wiped out between 1877 and 1887, so that the buffalo coats which the street car men wore when I was a sub-freshman were a luxury of the rich when I was graduated. Usually as the cost increases it tends to cut down the consumption until a certain balance is attained depending upon available substitutes, and so the price slowly rises and consumption keeps on decreasing. That is the way in which our anthracite coal fields, and the British coal and iron ores are now becoming exhausted; a large part of our anthracite now comes from fine stuff formerly thrown away. Moreover, in many cases there may be both an accumulated stock and a continuous supply. For instance, it is so to a certain extent with our forests. The magnificent growth the pioneers found here was an accumulated stock. But in many countries forests, like a farmer's wood lot here, are looked to for a continuous supply. We must soon be in that case. Originally the great white pine belt extended over 400,000 square miles and there may have been 700 billion feet of it at the beginning, say in 1851. By 1901 there was but 110 billion feet, which was going at the rate of seven billion feet a year.

So within ten years there will be no more white pine—it will be hemlock, jack pine, anything. As the annual consumption in the United States is some 25 billion cubic feet, and the total forest area of the United States is some 500 million acres, from which American lumbering practise will only get 420 board feet a year, it is obvious that even though we improve to the standard of the German practise of 660 board feet per annum, we must still either reforest large areas or find substitutes. It is difficult to see the national economy of rushing through our timber pellmell at a low price and then buying that of our neighbor, Canada, at a high price.

Besides stored up treasures of wood and coal, the loss by extermina-

tion of any native animal or plant is one which may indeed be small, but may easily be irreparable. The last survivor of those flocks of wild pigeon which once darkened the sun seems to have winged his solitary way to that bourne whence no traveler returns, which the fowler's eye may vainly strain to discern. The same thing is almost true of the wood-ducks. Logging operations have absolutely cleared many a stream of trout, and it might easily be that grayling, whitefish and sturgeon would become as unknown as the wolverine in the wolverine state.

I presume that in some exterminations like those of the rattlesnake and the wolf there is a distinct gain. But it is not well that we should let these exterminations of our animal neighbors go on in sheer heedlessness, but take some pains to preserve and propagate those most valuable. A great body of laws on game preservation and fish culture show that we realize something of this. Yet I venture to say that we still know far less than we might of what animals should be preserved and especially how best to do it, or which of our animal friends are being exterminated and how best to stop it. Many a well-meaning action fails in its object because based on imperfect knowledge. The laws for the preservation of lobsters are aiding their extermination.

First then as regards these exhaustible resources one should know what is happening. Again, the consumption should be as little wasteful as possible, getting the full benefit of all that is used.

Thirdly, the product should be so used that we may have something to show for the exhausted resources and, in particular, so far as possible, substitutes should be devised and developed.

Now as to the kind of knowledge we ought to have. Marl or boglime beds which have been used as the base for cement factories have been produced in the past few thousand years, but the lake algae and shells are still busy abstracting lime from the hard water. One thing which it would be interesting to know is how fast our marl beds are growing and how many acres of pond and bog and cubic yards of boglime a company would need to have so that when they got around they could begin over again. The state might well encourage such an investigation and also see how fast it could be accumulated by the fittest plants. In the same way with peat bogs. If peat comes to be a popular fuel, it will at first be mainly on accumulated peat that we shall draw; but it will also be worth while to know how fast a bog can be made to grow and whether its growth can be stimulated by changes in water level or by encouraging appropriate plants. It is a good reason that scientific research be endowed on just this ground, that when the present coal mines are exhausted one may know where most readily to find new, and when these in turn are but hollow voids some inventor shall have found a storage battery that will turn Ariel from a tricksy sprite to a mighty genius of work and make the wind-

mill as much a source of power as the water-wheel. Thus as earlier sources of power, lumber waste and coal are exhausted, one may turn to oil or gas, or use water power to develop electric heat or grow fuel either as four-foot wood or as peat, whichever shall be proved by scientific experiment to be the most economical.

A Frenchman has recently suggested setting a coal mine on fire and pumping down just enough air to make water gas and then burning this gas as it comes to the surface. If this idea proves feasible it will add untold millions to the wealth of this state in seams which it will not now pay to burn. But in any case by the time our coal is gone we should be ready with our streams already dammed and copper cables covering the land to furnish more power from water than we now use from coal.

So again little by little the unfertilized farm will become less fertile, for in spite of all the care and skill of the Michigan farmer, the wheat product per acre of the lower four tiers of counties of Michigan does not bear the same ratio to that of the state that it once did. It is well worth while, therefore, to see that we are getting our money's worth in buying fertilizer to replace the fertility. It should be worth while to see that we do not squander valuable potash salts in making table salt, or burning lumber waste, etc. Again, as the forests depart, not only should we cherish what is left, but with the proceeds, before we are left naked, poor and desolate, we should plan and develop substitutes, tile and slate for shingle, cement, sand-brick and stone for building, stone, cement and steel bridges for wooden, and paving brick and macadam for cedar block and corduroy.

So too by the time the present iron ores are becoming exhausted scientific chemists should have found some economic method of smelting leaner ores or, better yet, of handling that vast bulk of iron ore, of which we now know, that is made refractory by only a few per cent. of titanium, and geologists may have found for us new ranges, or extensions of the old ones. Moreover the necessary consumption should be as little wasteful as possible. Legislation which is such that 'we skin through as fast as we can and then throw the land back on the state' is not wise legislation. There are, indeed, two parties in politics and in economics as to whether the state should hold for itself these natural resources. But if it be granted that the state should put these in the hands of individuals to exploit, it is certainly short sighted to then so legislate in the hope of getting back again 'unearned increments' by taxation that the individual is tempted or even forced to rush through the development, squandering a large proportion of the resources, in order to get the utmost possible returns to himself.

In the same way the policy of taxation which leads those with accumulated property to leave the state and transfer the money which they may have made from its resources to some other clime and their

interests to other institutions will not correct any error which may be supposed to have been made in allowing them to accumulate that wealth in the first place.

It is often proposed to correct and control the excessive accumulation of wealth and the power or wealth by competition, but it must be remembered that competition is a most potent source of waste. The different iron ores are used together to produce a maximum amount of iron from a minimum amount of iron ore, because they are all owned by the same parties, regardless of the fact that some of the ores can be produced much more cheaply than others. But if the ore belonged to different parties and there were free and unrestricted competition the most cheaply produced ore would crowd the others for a time entirely from the market, and would cause a decay of the town supported by their development. I do not think that any one would consider this desirable, and certainly from the point of view of the geologist there would be a waste of resources.

It is lucky for Michigan that the iron ore of Lake Superior is held by a comparatively few strong corporations, the U. S. Steel Corporation having, say, a billion tons on the Mesabi range and many million tons on the older range. The Mesabi ore is a mere mass of varicolored dirt. I saw five forties last summer said to contain 200,000,000 tons of ore. All that has to be done is to run in trains of ore cars and load it on by steam shovels, after once the layer of clay till, etc., overhead is removed. The huge, yawning, red chasms thus left when weathered in the smoke of puffing locomotives and laboring steam shovels, present a volcanic and truly infernal picture. In time some of them will be 400 feet and over deep. The ore, too, is largely of the highest grade. What could any ordinary iron mine do in competition with such, especially those of Michigan, where the miners have all now disappeared underground?

Fortunately, however, it has been found that in the draft of the blast furnace in which these ores are reduced to iron, a good part of this light powdery ore is liable to be blown out if not held down by something more substantial. Moreover, a certain amount of some flux must be added to aid the flow of the iron, and the silica of some of our Michigan harder ores, poorer in iron, is admirably adapted to that end. And as the same interests own properties in both states they prefer, rather than to let their Michigan properties go to rack and ruin, to use a moderate amount of that ore and save wasting their Mesabi ore, even if thereby it is not produced quite as cheaply at the moment. They fix the price, and in the long run it will be doubtless better for the community and corporation. More iron will be made with less work, by mining the high grade and low grade ores together, than there would were the high grade ore first run and wasted and then the low grade ore developed. The same thing is true regarding coal. In an era of unrestricted competition only the choicest portions of the best seams

would be put on the market provided, as is true, there is a possibility of producing more coal than can be consumed. So on Spindletop unrestricted competition crowded an area of less than 200 acres with derricks drilling holes as thick as they could be set and caused an expenditure of over $15,000,000, where a million should have been ample.

Customs, such as that of paying royalty only on the coal mined, may favor wastefulness. If the royalty were per acre foot, it would pay to mine more closely, as I have said in my report on coal. Thus it is for the state's interest that coal royalties should be per ton on coal in the ground, not per ton of coal hoisted. This is practicable and done in some coal fields. In the case of iron ore, too much property has changed hands on the basis of the ore in the ground, as shown by drilling.

In the same way in Indiana it has been found necessary to pass laws restricting the waste of gas or oil, because in so many cases it was cheaper for the individual to save the one and waste the other, regardless of the effect upon the resources of the state or his neighbor's wells. It would seem, therefore, that in relying upon competition as a cure for the ills of the body politic or in attempting taxation of the 'unearned increment' we should not fail to consider carefully the effect of these remedies upon the development or conservation of those natural resources of the state which, once squandered, no financial or political legerdemain can restore.

I know that the questions here raised are difficult ones and I know no panacea for all the wastes of the body politic. I might, indeed, suggest that it seems to me that municipal or state ownership is too often treated as synonymous with municipal and state operation and exploration. The Boston subway is a good illustration of public ownership and private operation, which apparently works better than would any other plan just now. I may perhaps remind you, too, that in Mexico all mining is under a system of state leases, and in Canada lumbering. State control under a system of wise leases, preventing waste, would seem to be wise, when complete state ownership was not. In the United States the policy has in general been for the state to divest itself of the title to its lands with the resources, even though they could be sold only for a song, and were mainly useful to be cut up into lots to be given away with 'free chickens.' Would not, in many cases, a lease for fifty years or longer have been exactly as well? It is a fair question, how far it is wise for a community to let its wealth go permanently out of its own hands, and in particular into the hands of non-residents. Non-resident property holders have been a source of friction ever since the days of the nobleman who let out his vineyard to husbandmen and went into a far country. Harvard University years ago, instead of selling Boston real estate outright, had a policy of letting it on a 99-year lease. And of late every now and then a piece of prop-

erty, like the Adams house, worth a couple of hundred thousand, reverts, and is a very welcome addition to their unrestricted funds.

Would it not have been, and even now be, a wise policy for the states and their land-owning institutions to have leased much of their lands for a term of years rather than deeded the property outright? Certainly a lot of land would have come back to them, and kept off that mælstrom of useless expense—the delinquent tax list. While this I would merely suggest, what I would urge is more careful and intelligent consideration of our waning natural resources, so that before they are gone we may develop substitute products and replacing industries, and that their proceeds may go in part into permanent improvements, stone roads replacing plank roads, stone or cement bridges wooden bridges, stone or cement dams wooden dams, and into other additions to the permanent wealth of the state.

It is hard to find any wealth that has been better spent for the permanent wealth of the community than that which has been spent on educational institutions. They produce intelligent citizens. They draw into the state an intelligent public which spend much money at the time. Many of them stay to help build up the state. Their buildings and equipment will be more and more Meccas and permanent objects of interest and attraction and resort. Their scientific researches will help to develop, to save and to replace our natural resources.

I can picture in my mind two fortunes, and they will be but composite photographs drawn from life. The one is built upon a reckless cutting out of the choicest of the lumber, none but the best taken, the brush left around and fired, either purposely or fraudulently, to conceal theft. In the path of the first fires is left either a tangled mass of worthless trash, overgrown with bushes and fireweed, ready fuel for the series of conflagrations that sweep through from time to time, or a sandy plain covered with sweet fern and goldenrod, used by speculators to defraud the settlers, who from time to time try to make a livelihood from it. There are here three wastes, the half-gathered crop of timber later burned, the land left in a useless condition, and labor wasted in trying to make it useful. The logs thus gathered are driven to the mill by a crew of loose livers whose hard-earned wages are largely scattered to the dive and brothel in a few weeks. The saw mills devour them and circular saws rip a wide swath of sawdust waste at each cut; piles of slabs, sawdust and waste of every description are transported in a continuous stream to an ever-burning fire whose pillar of cloud by day and fire by night betokens not the presence of Jehovah, but the demon of destruction. The timber itself is shipped away, and the money thus acquired by one who keeps on making money because he does not know what else to do is squandered by his heirs, who by them-

selves or by those whom they purchase as husbands scatter it to scandalize two continents.

The forest, the accumulation of generations, and of ages of sunshine, rain and dew, is gone, and there is less than nothing to show for it. This is criminal waste.

Now let us paint a brighter picture. Into the forest go a lot of pioneers, such as Ralph Connor loves to picture, bent on caring for themselves and their children. The instructions are to cut every green top, and every thing is gathered up, even old half burned logs. Whatever is not otherwise used is used for fuel in making salt, but all that can be used down to stuff that will only make lath or matches or toothpicks is saved, and pains are taken to make even the narrow bandsaw cuts as narrow as may be. The land is left ready, if it is good enough, for one of those same sturdy pioneers to take hold of and make a farm that will be the stay of his old age and the homestead of his children. That best fitted to remain forest returns once more to the state to be reforested.

The lumber goes where it is most needed, but part of it into buildings within the state, of permanent artistic value. The fortune thus acquired is expended perhaps in part in reforesting those parts of the tract that are better suited for forest growth permanently than for anything else, and in their fire protection, but those lands hardly worth paying taxes on are deeded to some state institution, to which after some years they will be of great value, while in the meantime they are kept off delinquent tax rolls. Another part of this fortune is employed in permanent improvements, roads and railroads, and in buildings which are a permanent addition to the beauty of the state as well as a memorial of the man who reared them. Another part goes in starting industries and providing education which will open fields of useful and valuable employment and keep alive the town where the fortune is made when lumbering ceases to be the all sustaining occupation. A part may be employed in exploring for coal, developing peat or water power, drilling for oil, mineral water or other resources to replace those that are vanishing.

The forest is then not wholly gone, and in the place of the part taken are fertile farms, with happy homes, noble buildings, intelligent people and varied industries, and the state is wealthier than ever.

The one picture is as true as the other, though they are put together like one of Thompson Seton's stories. That the brighter picture should be the one becoming more true, each man of intelligence enough to recognize the situation, each citizen of the kingdom of science, as well as the republic, should strive.

THE HONOR SYSTEM IN AMERICAN COLLEGES

By Professor W. LE CONTE STEVENS
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A CRITIC who was fond of unusual statements once declared that ignorance and unconsciousness are the best tests of good health. The man whose digestive powers are unimpaired has no conclusive evidence of his possession of a stomach. Hunger may be referred to as an aching void, but the discomfort is not localized until the digestive machinery gets out of order and pain tells the victim that in some way he has abused an internal friend whose unknown presence has been a source of quiet serenity.

In American educational circles the honor system in colleges has been a subject of discussion only since the close of the civil war. Prior to that time, like the unobtrusive stomach, it had long performed its function peacefully in some parts of our land, while the general public was ignorant of its existence. Of late years there has been enough internal disturbance to suggest the presence of a collegiate organ that demands recognition.

It is not possible to say just when or where the honor system had its birth. It had indeed no birth, but was merely a manifestation of social conditions at the south. During recent years the annual catalogues of the University of Virginia have contained the statement that in June, 1842, after the system of surveillance in written examinations had been found ineffectual, Judge Henry St. George Tucker, professor of law, induced the faculty to adopt the following resolution:

> **That in all future written examinations for distinction and other honors of the university each candidate shall attach to the written answers presented by him on such examination a certificate in the following words: I, A. B., do hereby certify on honor that I have derived no assistance during the time of this examination from any source whatever, whether oral, written, or in print, in giving the above answers.**

The editor of the catalogue adds 'this was the beginning of the honor system.' Such a conclusion is warrantable if understood to mean that this was probably the first formal adoption of a college code of examination ethics that had been previously in existence without formal legislation. The South Carolina College has within the present year celebrated the centennial anniversary of its organization, which occurred twenty years before the incorporation of the University of Virginia. In a sermon delivered on January 8, 1905, the chaplain of the college, Dr. Flinn, declares that 'in the very beginning of the his-

tory of the college the honor system of student control was established.' He quotes a by-law, formulated by the trustees of the college, certainly within a few years after its organization and published from year to year, in which the essential principle of the honor system is set forth in these words:

> The sense of decency, propriety and right, which every honorable young man carries in his own bosom, shall be taken as a sufficient means of knowing these things, and he who pleads ignorance in such matters is unfit to be a member of the college.

No one of the present generation can properly make any definite statement as to the universality of the honor system in our institutions of learning a century ago, or even a half century ago, but in most of our older southern colleges tradition seems to indicate that it has long been in force.

It is easy to understand why southern colleges should have been the natural home of the honor system. The distinguishing characteristics of southern civilization a few generations ago made it to a large extent spontaneous. Education was not deemed a necessity for all, but rather a privilege belonging to those who could claim, either actually or prospectively, the title of gentleman. A young man went to college not with a view to preparing for a special vocation in life, but because a liberal education was generally regarded as the indispensable badge of the gentleman. Elective courses were unknown. Latin, Greek, mathematics and moral philosophy were studied by all and mastered by few. To be recognized as a scholar was a high honor, and those who achieved it felt a pride in their ability to quote from Seneca or Homer in the original. The son of a gentleman was taught to despise deceit. Cheating was naturally to be expected among traders and day laborers, but these could not be expected to study Seneca or Homer, to seek the scanty knowledge of astronomy and botany that was offered as science, chiefly with a view to its bearing on natural theology, or to appreciate and analyze the evidences of christianity on which every college-bred gentleman was required to stand examination before receiving the degree of bachelor of arts.

We have no special ground for thinking that human nature has ever been very different from that of to-day, and the college classes from which our grandfathers were graduated must not be invested with any halo of sanctity. Neither virtue nor vice belongs more to one generation than another, whatever may be the color of the telescope glasses through which we look back at our ancestors. There is no reason to suppose that manners and morals were any better a century ago than to-day. The advance in civilization suggests the presumption of improvement, but morality, as well as knowledge, is relative; and offenses change in importance with the lapse of years. Whatever

may be the gains that we have made otherwise, the obligation to avoid cheating in the college examination room was certainly more insisted upon by southern students prior to the civil war than it is to-day in the country at large. Custom and tradition had established a standard that every son of a gentleman felt it his privilege and duty to maintain. To violate this unwritten law was perilous for the young man whose home training had been defective. The temptation to cheat might be strong, but to incur the contempt of his fellow students was a risk that could not be lightly undertaken.

The firm establishment of such a code of college honor at the south was undoubtedly an outcome and manifestation of the extreme conservatism characteristic of that section during the period when communication with other parts of the world was very limited. It antedates the railroad and telegraph. Travel was restricted, and local customs were correspondingly fixed. Similar restriction existed, perhaps to a less extent, at the north; but at the south the institution of slavery had established class distinctions in society which were more sharply defined than was possible where the population was almost confined to a single race. The southern college was completely dominated by a single social class. The upheaval and confusion, the impoverishment and chaos due to political destruction and reconstruction, were not sufficient to extinguish at once the college traditions established by an aristocracy that retained its pride after its wealth had been annihilated. The honor system was cherished as a heritage to be proud of, one that was inseparably linked with the traditions of the lost cause.

Forty years have not been enough to efface the influence of these college traditions at the south. At the north they had never been established. This statement does not imply that the ethical code customarily in force among northern students was inferior to that at the south. It means that certain actions were forbidden by student opinion in the one section and deemed permissible by student opinion in the other, such opinion being in each case determined chiefly by local precedent. Political fealty and church affiliation are well known to be determined more frequently by prescription rather than by argument. It would be remarkable if student opinion were more judicial. The differences of opinion between a democrat by inheritance and a republican by inheritance are certainly no greater than between southern and northern students in their traditional views about the honor system. Neither side has a monopoly of virtue.

The present writer was reared amid influences where the honor system was dominant, receiving his baccalaureate degree in South Carolina. During college days on one occasion he took part in a mass meeting of students held for the investigation of a supposed breach of the honor system. The questions to be used in a w[illegible]xamina-

tion had been printed, and an unpopular student was accused of securing a copy from the printer on the night before examination. Conviction would have implied his expulsion by demand of the student body. The ground of complaint was not so much that the use of the questions would be unjust to fellow students as that the action alleged was characteristic of a sneak unfit to associate with gentlemen, and involved the culprit's signature to a false statement that his answers were written without aid. The accusation was based on circumstantial evidence alone and could not be sustained. The trial was necessary in the interest of the defendant, whose accusers were fellow students. So long as there exists such a jealous demand on the part of students that cheating shall not be tolerated in any form, direct or indirect, college authorities are abundantly safe in allowing them self-government.

But all cases are not so simple as the one just cited, nor is popular sentiment usually so pronounced as to secure the prosecution of offenders. Indeed the honor system is no longer a characteristic of any one section of the country. In the same institution of learning it may be trusted during one year and found wanting during another. College tradition has been perceptibly weakened during forty years. Ideals of education have been revolutionized, and it would be extraordinary if ideals of college honor should not be subject to gradual modification. The assumptions that once served as the foundation of the honor system can no longer be accepted without reservation, and the administration of such a system must be modified to suit changed conditions. It may be instructive to inquire briefly into these changes.

The southern college is no longer under the control of the social class that was in power when the honor system became established as a fact without being known as a system. With the establishment of public education at the south the classical academies have been dying out, one by one, and their places taken by the public high schools of the cities. The spirit of inherited aristocracy has been gradually disappearing, and with it are vanishing the home ideals that were formerly carried to the college. Population has grown, and the diffusion of elementary education, though still far from complete, is much better than it was a generation ago. Young men no longer come to college to receive the badge of respectability. They come to secure as directly as possible what they hope to utilize in the approaching competition with the world for a living. The testimonial of scholastic success is a baccalaureate or professional degree, the value of which depends upon the reputation of the college. Culture for the sake of culture, training for the avowed purpose of mental gymnastics, the pursuit of science for the love of knowledge and the desire to add to the sum of human ideas, have their advocates still, especially in the universities; but to the great majority of students such motives

are foreign. The greatest stimulus to effort is success, and the love of conquest in competition will continue indefinitely to incite students to activity in apparent disregard of utilitarian ends; but with all due allowance for this well-known fact in human nature, popular ideals have changed to such an extent that the maintenance of the honor system must be based on a foundation different from that which maintained it during its early development.

A college degree involves an expenditure of much labor, and often of money that the student can ill afford. In preparing for his examinations he is at times compelled to grapple with topics that are unattractive, subjects that would be sedulously disregarded if they were not prescribed as requisites for the degree sought. If credit can be secured for success without full payment in labor, if deception can be practised for the avoidance of irksome tasks, is such procedure different from current practise in the world of business? Can the student be expected to rise in the college class-room above the ordinary standards of honor in society, in the street or on the athletic field? If the most conspicuous leaders in politics, the organizers of great business corporations, the presidents of railroads and insurance companies, grow rich and prosperous by taking advantage of their opportunities to appropriate unearned dividends, to concentrate on the favored few what belongs to the unprotected multitude, is it remarkable that a student under temptation should profit by such lessons and make the best of an opportunity to win an unearned degree, or secure unearned credit for an examination by misrepresentation? The honor system in college is merely an application of the standards of Washington and Jefferson and Lee in political life. If such standards are too antiquated and simple for twentieth-century politics and finance, nothing can maintain them in the twentieth-century college.

But the honor system is not yet extinguished, hopeless as may be the outlook for it in some quarters. Its existence in any institution of learning is possible only where the demand comes from the majority of the students rather than from the faculty. If such a demand is based on local tradition alone it is doomed to inevitable extinction. No tradition can survive in opposition to the consensus of contemporary thought and feeling. But it has its reason for existence, quite aside from tradition, in the sense of justice and fair play. The majority of young men under normal conditions are disposed to uphold what they conceive to be just. In general society penal laws are necessary to restrain criminals, and the criminal is the exception. The college criminal who cheats in the performance of college duties is found in every college, but he too is exceptional. If he and his friends are so active as to necessitate penal laws that imply hardship to the student body as a whole, the majority have a right to demand the expulsion of the offender.

It was under such conditions as these that the honor system was adopted at Princeton about a dozen years ago. It was introduced likewise at Cornell University, at Amherst, Williams and other northern colleges. At Princeton it is reported to be still giving satisfaction, although there have been occasional spasms of apparent weakness. In the other institutions named it seems never to have become very deeply rooted. Its maintenance, as well as its introduction, required organization among the students and tact on the part of those whose duty it was to teach and examine. There seems to be a growing feeling that the honor system, even if exotic, ought to be encouraged if students can be induced to adopt it; that self-government is the best government if it is only real government. But where no supporting tradition already exists on such a subject it is as hard to make reliable calculations on the stability of student opinion as on the magnitude of political majorities.

For the introduction of the honor system into any institution of learning, or for its subsequent efficiency, the first essential is the organization of a college court, composed of leading representatives from the most important classes or departments. The efficiency of such a court depends upon the earnestness and watchfulness of a small minority of the student body who are public spirited enough to endure temporary inconvenience and to risk their personal popularity by reporting those who offend against the laws adopted by the student body. If there are never any indictments there can be no need for a court. Since the college world is not wholly made up of angels, it is absolutely certain that offenses will be committed. If nobody is willing to act as prosecutor or complainant the law becomes a dead letter, and the court dies a natural death. But such a court should be organized in every college and its vitality should be tested by actual practise. To its jurisdiction should be committed all cases of crookedness in class or examination or in anything else that affects the welfare of the student body. If a young man shows to his fellow-students that he is dishonest outside of the class-room, it is not necessary that the enforcement of the honor system should be limited to matters connected with written examinations. The voice of the student body should be heard even if it be not always judicial. The student court should indeed not be a court of last resort. Its rulings should be subject to examination by an appellate court consisting of the president and a committee of the faculty of the institution. The right of appeal to this supreme court should never be yielded, but such appeal should not be demanded unless strong reasons for it can be established.

Even if a good student court has been organized, the maintenance of the honor system may be and often is nullified by the unwillingness of students to inform against the violators of law. This indeed is the greatest difficulty to be overcome in practise. A student whose mental

ability is limited, but who is conspicuous in athletics and personally popular, yields to temptation in the examination room, or otherwise resorts to fraud in order to win scholastic credit. He is shielded by the members of his fraternity, and their influence is such as to prevent his indictment before the college court even if his offense is repeated several times. At last he is caught by some professor through internal evidence in an examination paper. He denies his guilt and his friends join him in the effort to make conviction impossible. The evidence is overwhelming and he must go. The loss of a leader on the athletic field is bewailed as a calamity to the athletic interests of the college, and a stay is secured on some technicality by which the dishonest athlete is retained until the close of the football or baseball season. He then goes, not in disgrace, but with every manifestation of regret on the part of admiring friends. Resentment is felt and openly expressed against the tactless professor whose abnormal conscience has made him expose the athlete's moral weakness. Of what importance is scholastic accuracy in comparison with victory in athletics? Why can not professors exercise more common sense and overlook the shortcomings of those whose athletic success advertises the college [illegible] young men more in one day than the professors can do in a year? Is college spirit to be disregarded in deference to out-of-date aphorisms about telling the truth? Has a student no right of mental reservation in signing an examination pledge when he has been unselfishly giving to athletics most of the time needed to prepare for examination? It is all well enough to insist upon the honor system when competing for honors, but why not give a chance to the fellow who wants merely to stay in college, to shine in young society and to help support all college enterprises?

The dominance of athletics as a factor in college life constitutes to-day one of the most serious obstacles to the maintenance of the honor system in colleges. The difficulty of maintaining clean athletics is notorious. So strenuous is the demand for victory that honor must go if it is accompanied with the danger of defeat. The jesuitic claim that the end justifies the means is continually made under various forms of disguise, and its reacting influence on the ethics of the classroom is inevitable. In an institution where the honor system is in force the football team is made up of young men whose examination pledges are respected. But in an intercollegiate match this team is called upon to meet competitors from a distance, and the code of ethics is changed to provide for the trickery and disguised professionalism in which the strangers are known to indulge. The honor system is reserved for application at home, but elsewhere the athletic organism must adapt itself to its environment. Cheating becomes allowable because it has been found impossible to exclude it from athletic contests. If the devil must be fought it is soon agreed that he shall be

fought with fire. The honor system has no place in intercollegiate athletics. Even some of the most ardent advocates of athletics admit despairingly that honesty in athletics can no longer be expected. Trickery and ruffianism are admitted to be necessary for victory. If such is the practical athletic code, familiarity with its working must inevitably affect the athlete's ideals in all cases where his interests are to be affected. If dishonesty is right in the collective struggle for victory it is but a short step to the conclusion that it is equally right in the individual struggle for a pass in examination. The claim is openly made in some colleges that the student is perfectly justified in cheating to win a pass mark, but should not cheat in a contest for honors.

The influence of intercollegiate athletics, and other influences that are obtrusive in politics and business, have already had a noticeable effect on the honor system among southern students. Taking the south as it exists to-day, the hold of the honor system in a few institutions is yet strong; in others precarious; and in still others quite non-existent. It would be easy, but not appropriate, to fortify this statement by mentioning concrete cases and giving names. Where the college is old, and especially if it is situated in a village or small city, the maintenance of tradition and of well-defined unwritten laws relating to student life is comparatively easy. If it is situated in a large city the relative importance of the college in comparison with other interests in the community is dwarfed, and the commercial spirit of the age is quite sure to become dominant. No well-defined code of college ethics can become established where the majority of the students meet only in class-room or laboratory, and where they are merged during the hours of study and recreation amid tens of thousands of people who never think of the college as a living organism with a recognized collective character. Young men who become enrolled in city colleges must be expected to exemplify the business ethics of the city. Among them will be found many individuals of high moral tone, as worthy of trust in the examination room as in the parlor. Fraternities and social cliques may be formed, but usually no general code of college ethics can become crystallized under the conditions of city life.

The conditions that are favorable and those that are detrimental to the maintenance of the honor system among students may be briefly summarized as follows:

1. The difficulty is least in small towns and greatest in large cities, as just set forth.

2. The difficulty is least with the most advanced students and greatest with freshmen. The advanced student has a well-defined purpose in view and appreciates the fact that his own interests are bound up with the actual mastery of the subject in which he is working. The young student is just from a preparatory school where probably he has

been thoroughly imbued with the idea that the chief object of his teachers is to impose tasks and limit his personal liberty. He feels a certain degree of exultation in 'getting ahead' of those whose duty it is to be vigilant, and he carries this spirit to the college. The temptation to cheat continues as long as fetters exist, whether actually or in his imagination.

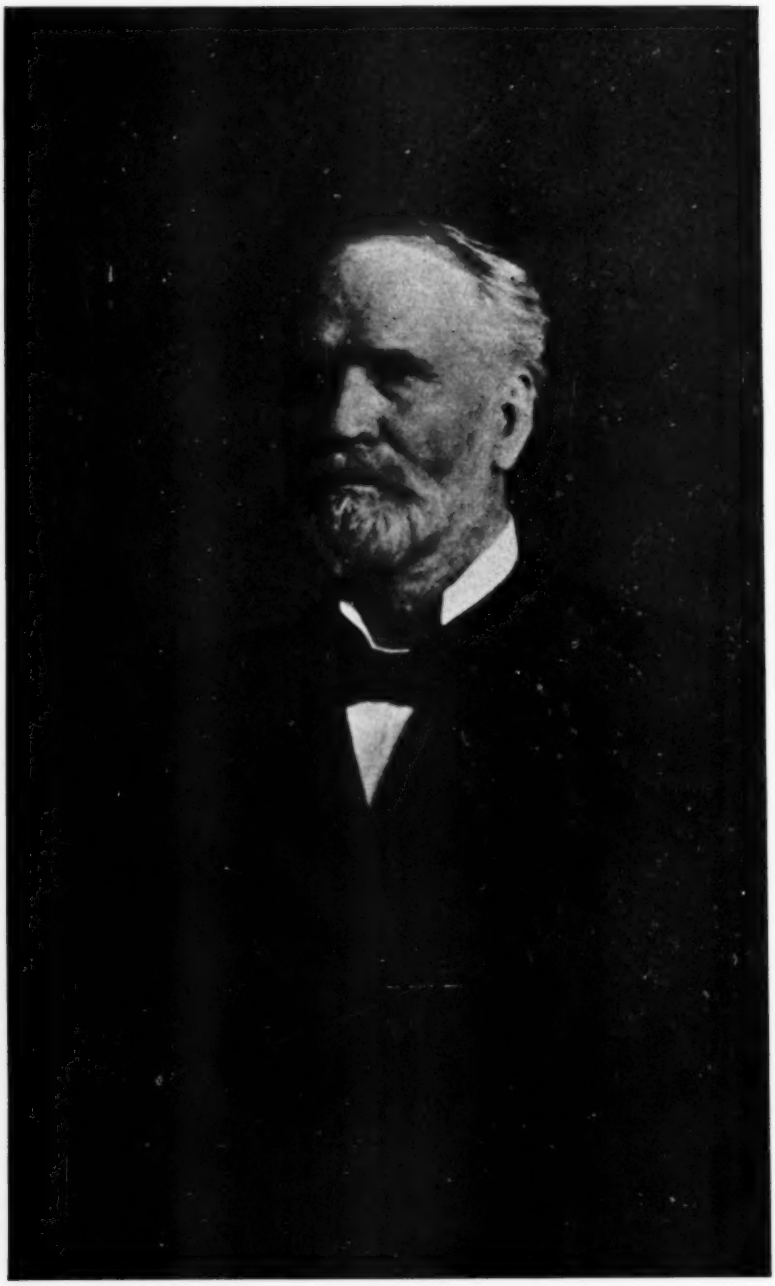
3. The difficulty is least where there is the greatest freedom in the election of courses of study, and greatest where a fixed curriculum is maintained with a high standard for graduation. The existence of a curriculum implies rigidity. The student must endure much arduous labor because it is prescribed. He may be informed that it will do him much good in due time, but he is skeptical, and cheating is the most natural resource.

4. The difficulty is observed to be greater in technical and professional schools than in those where much of the work is avowedly for the sake of culture. In the technical school the cost to the student is high. He wishes to begin applying his acquisitions to the work of self-support as soon as possible. To fail in an examination may mean the spending of many hundreds of dollars extra, and the loss of a year of valuable time from remunerative employment. He regards the entire subject from a commercial standpoint and treats it as such.

The most conspicuous tendency in America of late years has been toward the substitution of urban activity for rural quiet. Urban standards are increasingly established in all the more prosperous institutions of learning outside of the cities. The gradual extinction of the honor system in colleges, as we understand this term to-day, seems, therefore, inevitable. Such a conclusion, though unwelcome, is not wholly pessimistic. The honor system where it now exists should be carefully guarded and everything possible should be done to encourage self-government in colleges, to develop the feeling of responsibility among the students for the integrity of the degrees conferred by the institution with which they are identified. The reputation of the college suffers irreparable injury if the public has reason to believe that its degrees are won by fraud. But in general society the honor system has its substitute in the unwritten code maintained by people of refinement and social culture. When interests clash or crime is committed recourse is had to the law of the land, and well known rules of legal procedure are applied. By the general public a man of honor is recognized as such after his habits of speech and action have been manifested and his character has become thus established. Whatever may be the differences of standard professed, college ethics will be conformed to the ethics of general society. Every student should be at least provisionally assumed to be a man of honor; and he should be treated as such so long as his conduct warrants the assumption. In the great majority of cases his word can be accepted, just as this is

done in polite society. But to make the rule universal, because the honor system is in force in a college, secures the most convenient cloak possible for the perpetration of fraud by the unprincipled student who knows that his denial of guilt will be promptly accepted. If a lie is convenient why not utilize it when no obstacle to self-interest is interposed by conscience? The acceptance of his word should be subject to modification by other kinds of evidence just as it is in every court of justice. No rule can be laid down regarding the discrimination between students who are reliable and those who are unfit to be trusted. The trickster should be distrusted until he is eliminated, but tact and discretion are needed in dealing with him. He is found in every community, and he should not receive the protection implied in treating all students as men of honor.

Let the honor system be maintained and applied to all who prove themselves fit to receive its benefits. College interests will sometimes clash, and college crimes will occasionally be committed, proving that some students are not gentlemen. If changes in the present administration of the honor system become developed they should be chiefly in regard to the rules of legal procedure. Let the college court be maintained and trusted so long as students manifest the disposition to make it really efficient. An honor system conducted in accordance with the rules of legal evidence will not secure perfection; but college ethics a century hence will be at least as good as to-day, and better adapted to changed conditions than if manufactured according to the prescription of the wisest of contemporary prophets.



THE HON. JAMES WILSON, SECRETARY OF AGRICULTURE.

THE PROGRESS OF SCIENCE.

THE WORK OF THE DEPARTMENT OF AGRICULTURE UNDER SECRETARY WILSON.

THE annual report of the secretary of agriculture is a record of scientific investigation and attainments by the national Department of Agriculture for the past eight years. The broad relations of the department's work give the report a wide general interest, and it illustrates anew the many practical benefits which may accrue to every-day affairs from intelligent and well-directed research and experimentation.

Secretary Wilson assumed charge of the department in the spring of 1897, and has been at its head since that time. This unusual period of service has been marked by rapid developments in work and organization, and by the elevation of the department as a scientific institution and in public estimation. The appropriations during this period have more than doubled, as has also the personnel of the department, and the scientific staff has increased from 925 in 1897 to 2,326 at present. Viewing the department's work in retrospect, it is somewhat surprising to note how many of the features which have brought it into prominence date from the present administration. The work in forestry, for example, which has assumed a position of such widespread importance, has been almost entirely developed during the past eight years. With the offer of practical assistance to forest owners in the management of their tracts, 'the field of action shifted from the desk to the woods'; and this was the beginning of a comprehensive movement, resulting in the formation of an intelligent public opinion and sound national sentiment which are rapidly placing the handling of forests and of the forest reserves upon a more enlightened and conservative basis.

The agricultural experiment stations in Alaska, Hawaii and Porto Rico have all been established and placed upon an efficient working basis under the present administration, and the influence and assistance of the department have thus spread to these remote possessions. The investigations in problems relating to irrigation from an agricultural standpoint, as distinguished from the strictly engineering features, have been inaugurated and organized upon a comprehensive scale. This work has proved so eminently practical and so important to irrigated agriculture that it has grown rapidly in extent and in scope, its appropriation having increased nearly tenfold. Out of it have sprung the work in land drainage and the still newer investigations upon agricultural machinery, so that operations covering practically the whole field of rural engineering have been inaugurated as an entirely new feature.

The breeding and selection of plants and varieties better adapted to special conditions or uses have been developed into a conspicuous feature, as has also the introduction of plants from foreign countries. Agricultural exploration for this purpose was instituted by the present secretary in 1898, with a small portion of the congressional seed fund which he was given authority to expend for that purpose. This has resulted in a vast number of introductions, such, for example, as the date palm, Turkestan alfalfa, Japanese rice, durum or macaroni wheats, and numerous other cereals. Durum wheat was first introduced in 1899, and has proved of such advantage in semi-arid lands that about twenty million bushels were

raised this year. The propaganda for sugar-beet culture was inaugurated soon after the present secretary came to the department, and the widespread tests of its adaptation to different parts of the country have shown the regions especially adapted to the crop and been followed by a nearly tenfold increase in beet-sugar production.

The Weather Bureau has greatly extended the range of its observations and its investigation in the domain of meteorological science, with the result of increasing efficiency and a wider application of its work. It is now said to be the most highly developed weather service in the world. The soil survey has been entirely developed under the present administration, and constitutes the first systematic attempt to make a comprehensive soil survey of the United States. In economic entomology there have been very important developments, and the scope of the work has been more than doubled, not to mention the extensive scale on which the Bureau of Entomology has worked in the campaign against the cotton boll weevil.

The Bureau of Animal Industry, in addition to stamping out an outbreak of the foot-and-mouth disease in New England, has attained very important results in the study of animal diseases and their control, and the meat inspection in its charge has very materially increased. The inspection work has also been extended under the Bureau of Chemistry to other food products intended for export and import, and a system of food standards has been worked out as a basis for guidance in federal, state and municipal food inspection.

These are only a few of the many lines enumerated in which investigation has been inaugurated or important progress made. The showing is a gratifying one, and affirms how definite has been the aim in expanding and developing the department to meet the manifold needs of our unusually diverse agriculture. In a word, its twofold object has been 'to add to the sum of intelligence of the man, and to increase the productive capacity of the acre.' In this it has been strongly supported by the agricultural experiment stations of the country, to which the secretary makes appreciative acknowledgment. "Not only have the stations been a vital factor in making the department's work more effective," he says, "but they have by their own investigations lifted American agriculture to a higher plane." These two great agencies working together have laid the foundation of a science of agriculture as a basis for teaching and practise, and have won the confidence and appreciation not only of the farmers but of the general public.

THE NEW ORLEANS MEETING OF THE AMERICAN ASSOCIATION.

THE meeting of the association at New Orleans during the Christmas holidays was thoroughly enjoyed by those members who were able to be present, and was of service in increasing in the south the influence of the association and interest in scientific work. The attendance was small, only 233 members being registered, but this was foreseen. The trip from the main centers of scientific activity was long for the Christmas holidays, and in most of the sciences meetings were being held simultaneously in more accessible places. The total number of scientific workers in the south is lamentably small. It appears from a computation recently made of the residence of the thousand leading men of science of the United States that only four of them live in the states of Georgia, Alabama, Louisiana and Mississippi; whereas there are 144 in Massachusetts, 43 in Connecticut, 35 in New Jersey and 47 in Maryland. The south has enjoyed a noteworthy development in its material resources in the past decade, and there is every reason to assume that its universities and other institutions concerned with the advancement of sci-

W. S. EICHELBERGER, Professor of Mathematics, U. S. Naval Observatory, Chairman of the Section of Mathematics and Astronomy.

ence will in the course of the next decade witness a parallel progress. And to this end the visit of the association to New Orleans will surely contribute.

New Orleans has the characteristics which with some exaggeration we attribute to the south. Its people are pleasure-loving and hospitable; the streets and restaurants are crowded; there were during the week of the meeting two race tracks in operation and two companies giving grand opera. As might have been expected the welcome to the association was cordial, spontaneous and unorganized. The meeting was truly appreciated, for in no place is science more highly esteemed than in New Orleans at the present time. As the Hon. C. F. Buck worded it in his address of welcome: "Our people are in a mood of worship in this regard. Through all the generations of the past has hung a dread,

W. T. SEDGWICK, Professor of Biology, Massachusetts Institute of Technology, Chairman of the Section of Physiology and Experimental Medicine.

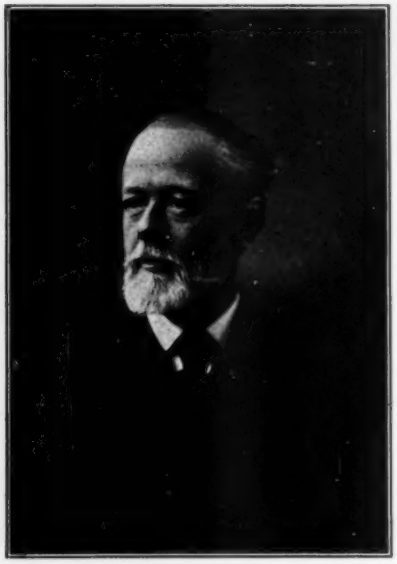
impenetrable shadow over our destiny. A mysterious disease which baffled human skill in its treatment and defied inquiry into its coming and going threatened all our hopes and expectations indefinitely. Science has lifted the shadow and unlocked the mystery. We look the future in the face with a new hope and an unshaken confidence. Your coming to us, so far away from the usual centers, just at this time, appeals to us like a voice of succor and a helping hand in a wilderness."

An interesting series of addresses was given by the retiring president, Professor W. G. Farlow, of Harvard

F. W. MCNAIR, President of the Michigan College of Mines, Chairman of the Section of Mechanical Science and Engineering.

HENRY CREW, Professor of Physics, Northwestern University, Chairman of the Section of Physics.

University, and by the vice-presidents of the sections—Professor Alexander Ziwet, of the University of Michigan; Professor Leonhard Kinnicutt, of the Worcester Polytechnic Institute; Professor E. A. Smith, of the University of Alabama; Dr. C. Hart Merriam, of the U. S. Biological Survey; Professor W. F. Magie, of Princeton University; Professor B. L. Robinson, of Harvard University, and Dr. Martin A. Knapp, of the Interstate Commerce Bureau Commission, and Professor David S. Jacobus, of Stevens Institute. These addresses are in course of publication in *Science*. Dr. F. P. Venable, president of the University of South Carolina, gave a presidential address before the American Chemical Society, and Mr. Elwood Mead, of the U. S. Department of Agriculture, gave a lecture complimentary to the citizens of New Orleans.

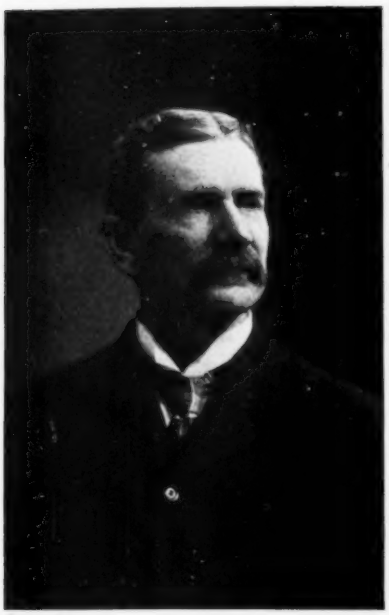


WM. NORTH RICE, Professor of Geology, Wesleyan University, Chairman of the Section of Geology and Geography.

HENRY B. WARD, Professor of Geology, University of Nebraska, Chairman of the Section of Zoology.

The programs of the sections, presided over by the vice-presidents, some of whose portraits we are able to give, were of unequal scientific value. The section of anthropology had no meetings, and in the cases of geology and zoology the programs were small. This is explained by the fact that the anthro-

pologists were meeting at Ithaca, the geologists at Ottawa and the zoologists at Ann Arbor. On the other hand, the chemists had their usual strong meeting with a program of eighty-two titles.



C. F. MABERY, Professor of Chemistry, Case School of Applied Science, Chairman of the Section of Chemistry.

The section of social and economic science also presented a full and good list of papers. Perhaps the most appropriate and interesting program was that of the section of physiology and experimental medicine, which arranged a discussion of yellow-fever and other insect-borne diseases, taken part in by some of those who have contributed in an important measure to our knowledge of these diseases, including Dr. James Carroll, who made the original experiments proving that yellow fever is transmitted by the mosquito and not by direct contagion.

The association decided to hold a special meeting at Ithaca at the end of June, and to hold its regular annual meeting at New York next winter. The decision to hold two meetings, reached after careful consideration at Philadelphia and at New Orleans, is an important movement, showing the growth of science in the country and the increase in the influence of the association which has now 4,300 members. The vice-presidents elected are:

Section A — Dr. Edward Kasner, New York City.
Section B — Professor W. C. Sabine, Cambridge, Mass.
Section C — Mr. Clifford Richardson, New York City.
Section D — Mr. W. R. Warner, Cleveland, O.
Section E — Professor A. C. Lane, Lansing, Mich.
Section F — Professor E. G. Conklin Philadelphia, Pa.
Section G — Dr. D. T. MacDougal, Washingington, D. C.
Section H — Professor Hugo Münsterberg, Cambridge, Mass.
Section I — Mr. Chas. A. Conant, New York City.
Section K — Dr. Simon Flexner, New York City.

Dr. W. H. Welch, professor of pathology in the Johns Hopkins University, was elected president of the association to preside at the Ithaca and Now York meetings. His portrait is

GEORGE GRANT MCCURDY, Lecturer in Anthropology, Yale University; Chairman of the Section of Anthropology.

given as a frontispiece to the number. Here again the advance of science and the growth in the scope of the association are shown, as pathology and bacteriology are for the first time recognized in the highest honor that his colleagues can confer on a man of science. They are fortunate in knowing that there is a student of pathology in the country who is preeminent in his science, and as the same time a leader in all good causes concerned with his profession.

SCIENTIFIC ITEMS

WE regret to record the deaths of Dr. William Rainey Harper, president of the University of Chicago, of Dr. Richard Hodgson, secretary of the American branch of the American Society for Psychical Research, and of Professor Charles Jasper Joly, F.R.S., astronomer royal of Ireland.

THE committee appointed to carry the proposal of a memorial to Rudolf Virchow into effect has now a sum of $20,000 at its disposal. Of this amount $9,000 has been contributed by subscribers and $11,000 by the city of Berlin.—A memorial to Professor Albert von Köllicker will be erected in Würzburg by the German Anatomical Society, of which he was an honorary president.—A memorial medal in honor of Andrée has been made by Londberg, the Swedish engraver. The artist represents Andrée's balloon rising from the ice. The explorer is looking anxiously toward the north. A group of young men are applauding, while an old man looks toward the horizon doubtfully. Below is the date, July 11, 1897. On the obverse appears the profile of André.

A DEPARTMENT of botanical research to include the Desert Laboratory and other botanical projects, was established by the action of the trustees of the Carnegie Institution at a recent meeting. Dr. D. T. MacDougal has resigned as assistant director of the New York Botanical Garden to accept the post of director of the newly organized department.—Major D. Prain, hitherto director of the Botanical Garden at Calcutta, has been appointed to the directorship of Kew Gardens, vacant by the retirement of Sir William Thiselton-Dyer.—Mr. F. W. Dyson, F.R.S., chief assistant at Greenwich Observatory, has been appointed astronomer royal for Scotland, in the room of the late Professor Copeland.

THE will of the late Charles T. Yerkes, who owed his large fortune to the direct application of recent advances in science, makes provision for three important institutions, which are to bear his name. The Yerkes Observatory, to which he has already contributed liberally, receives $100,000, the Yerkes galleries and the Yerkes hospital are to be established in New York City, on the death of his widow, or sooner should she wish. The hospital will also be established in case of the death of one of the two children. After certain bequests to Mrs. Yerkes, to his son and daughter and to others have been made, a trust fund is established, most of which will ultimately go to the support of the hospital. It is said that the value of the house on Fifth Avenue to be used for the galleries is $1,000,000, and that the value of the collections is $4,000,000. $750,000 are provided as an endowment fund for the galleries, which will be under the control of the Metropolitan Museum of Art. The hospital, which is to be situated in the borough of the Bronx, will receive, it is estimated by the daily papers, from $5,000,000 to $16,000,000.